This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Library
of the
University of Wisconsin

CARNEGIE LIBRARY OF PITTSBURGH

SEWAGE DISPOSAL AND TREATMENT

REFERENCES TO BOOKS AND MAGAZINE ARTICLES

Reprinted from the Monthly Bulletin, November 1910

LIBRARY OF THE
UNIVERSITY OF WISCONSIN
MADISON

PITTSBURGH
CARNEGIE LIBRARY
1910

191802
FEB -1 1915
SXD
.2P68

6701899

Contents

	Page
Introduction	4
General and theoretical	5
Books	5
Other references	8
Treatment by special methods	37
Broad irrigation	37
General	37
Individual farms	40
Chemical precipitation only	43
General	43
Individual plants	47
Disinfection, including electrolytic methods	51
Filtration, with or without preliminary treatment	54
Through contact beds	54
General	54
Individual plants	59
Through intermittent filters	64
General	64
Individual plants	69
Through continuous, percolating, sprinkling or trickling filters	77
General	77
Individual plants	80
Sedimentation only	84
Septic tank treatment only	86
General	86
Individual plants	89

Introduction

Several former bibliographies issued by this Library have dealt with various problems of municipal and sanitary engineering, such as "Smoke prevention," "Refuse and garbage disposal," "Floods and flood protection" and "Metal corrosion and protection" (including electrolytic corrosion of gas and water pipes).

The following list covers a subject of considerable present importance throughout the country, and of especial interest to municipalities in Pennsylvania. With the exception of patents it contains all useful literature in this Library on the disposal of sewage from water-carriage systems, except disposal by dilution only, that is direct discharge into streams or the sea without preliminary treatment. It does not include sewage analysis, stream pollution or design of sewers and sewerage systems. Articles are classified according to the most prominent features of the systems described, and are entered under the author's name, with the single exception that the numerous reports issued by the Massachusetts state board of health have been entered under that heading instead of under names of the individual authors and investigators. The list, which has been compiled by Mr W. C. Holmes of the Technology Department, is complete up to November 1, 1910. Special attention has been given to explanatory notes.

A further source of information on devices for sewage purification will be found in the extensive patent collection of the Technology Department.

In the titles of books and articles uniformity in spelling has not been attempted, the spelling of the original having been followed in each case.

The following abbreviations have been used:

diag.	diagrams.	p.	page or pages.
dr.	drawings.	pl.	plate.
ed.	edition.	pt.	part.
ill.	illustrations.	v.	volume.
no.	number.	w.	words.

E. H. McCLELLAND,
Technology Librarian.

Sewage Disposal and Treatment

General and Theoretical

Books

Ainge, Thomas S.

Disposal of sewage in unsewered localities. 16 p. 1908. (In his Sanitary sewerage of buildings, p.174.)

Considers briefly broad irrigation and describes plant for septic tank treatment of sewage, followed by filtration.

Baker, M. N.

British sewage works and notes on the sewage farms of Paris and on two German works. 146 p. 1904.

Summary of practice, describing a number of sewage works in actual operation, and emphasizing the features of interest to engineers engaged in such work.

Baker, M. M.

[Sewage purification.] 50 p. 1896. (In his Sewerage and sewage purification, p.95.)

Summary of methods in use in 1896.

Barwise, Sidney.

Purification of sewage; being a brief account of the scientific principles of sewage purification and their practical application. 220 p. Ill. 1904.

From a biological and chemical point of view.

Baumeister, R.

Purification of sewage. 52 p. Ill. 1895. (In his Cleaning and sewerage of cities, pt.2.)

Includes chapters on chemical precipitation and precipitation tanks, filtration, irrigation, costs, etc.

Bergey, D. H.

Removal and disposal of sewage. 26 p. Ill. 1904. (In his Principles of hygiene, ed.2, p.157.)

Brief readable summary of modern methods.

Boulnois, H. Percy.

Sewage disposal. 9 p. 1898. (In his Municipal and sanitary engineers' handbook, ed.3, p.330.)

Brown, G. P.

Drainage channel and waterway; a history of the effort to secure an effective and harmless method for the disposal of the sewage of the city of Chicago, and to create a navigable channel between Lake Michigan and the Mississippi river. 480 p. Ill. 1894.

Corfield, W. H.

Treatment and utilisation of sewage. Ed.3. 511 p. 1887.

About half of the book is devoted to water-carriage systems of sewage disposal, by precipitation, filtration and broad irrigation.

Cosgrove, J. J.

History of sanitation. 124 p. Ill. 1909.

Contains references to the historic development of sewage disposal.

Cosgrove, J. J.

Sewage purification and disposal. 222 p. Ill. 1909.

Covers the whole field, giving but brief treatment to each branch of the subject.

Denton, E. Bailey.

Sewage purification brought up to date, 1896. 44 p. Dr. 1896.

Describes methods in use (1896) in various towns in England.

Dibdin, William J.

Purification of sewage and water. Ed.3. 379 p. Ill. 1903.

Consideration of British practice (1903) in the bacterial treatment of sewage. Author has done much pioneer work with bacteria or contact beds.

Dunbar.

Principles of sewage treatment. 271 p. Ill. 1908.

Bibliography, p. 15-19.

Comprehensive, critical review, giving prominence to scientific principles involved rather than to features of engineering construction.

Easdale, W. C.

Practical management of sewage disposal works; a handbook for those in charge. 56 p. 1909.

Not a technical treatise but a guide to maintenance based on such operations as have been sanctioned by extensive experience.

Easdale, W. C.

Sewage disposal works; their design and construction. 300 p. 150 ill. 1910.

Folwell, A. Prescott.

Sewage disposal. 34 p. 1 diag. 6 dr. 4 ill. 1910. (In his Sewerage, ed.6, p.359.)

Good general treatment of sewage disposal demands and methods as applied in American practice.

"It may be said that Mr. Folwell's 'Sewerage' as it now stands is the only single volume work in which all phases of sewerage design, construction and maintenance, as well as sewage treatment, are treated, and that in addition the volume deserves commendation as a comprehensive survey of the whole field indicated, brought within reasonably small compass." *Engineering news,* 1910.

Gerhard, William Paul.

Disposal of household wastes. 195 p. 1890.

Describes methods for removing sewage from country houses, institutions, and houses in villages and cities.

Gerhard, William Paul.

Sanitation of public buildings. 262 p. 1907.

Gives a little information on the disposal of sewage.

Gerhard, William Paul.

Sewage disposal of country houses. 112 p. Ill. 1909. (In his Sanitation, water supply, and sewage disposal of country houses, p.217.)

Gives the sanitary principles that should be followed in the disposal of sewage of isolated houses.

Gillette, Halbert P.

[Cost of sewage disposal.] 7 p. 1910. (In his Handbook of cost data for contractors and engineers, ed.2, p.936.)

Data from about ten cities on the cost of plants purifying by different methods.

Haefcke, Hermann.

Städtische und fabrik-abwässer; ihre natur, schädlichkeit und reinigung. 469 p. Ill. 1901.

"Literatur-verzeichniss," pref., p. 13-16.

Concise summary of present (1901) practice in sewage disposal.

Harcourt, Leveson Francis Vernon-.

Sewage disposal. 112 p. Ill. 1907. (In his Sanitary engineering with respect to water-supply and sewage disposal, pt.2.)

General treatment of land disposal and bacterial methods.

International Correspondence Schools.

Sewage disposal. 30 p. Ill. 1905. (In International library of technology, v.72: House sanitation, plumbing, section 48.)

International Correspondence Schools.

Sewage purification and disposal. 64 p. Ill. 1907. (In International library of technology, v.98: Water supply, sewerage, section 92.)

Review of methods in use (1907).

Jones, Alfred Stowell, & **Roechling,** H. A.

Natural and artificial sewage treatment. 96 p. 1902.

Compares land treatment of sewage with disposal by bacterial processes, considering especially advantages of land treatment.

Kinnicutt, Leonard Parker, *and others.*

Sewage disposal. 436 p. Ill. 1910.

"References," p.411–421.

Has special reference to American conditions and to the most recent practice. Includes rather full discussion of chemical and bacteriological principles involved, as well as of the important engineering aspects of disposal works already designed. By authorities of long and active experience. The most exhaustive work on the subject.

McCullough, Ernest.

Sewerage. 19 p. 1906. (In his Engineering work in towns and small cities, p.79.)

Brief review of methods of disposal.

Merriman, Mansfield.

Disposal of sewage. 35 p. 1906. (In his Elements of sanitary engineering, ed.3, p.180.)

Good description of methods in use and principles underlying them.

Moore, E. C. S.

Sewage disposal. 218 p. Ill. 1909. (In his Sanitary engineering, ed.3, v.2, p.566.)

Especial attention to patented methods and devices. Describes a number of the British sewage purification plants.

New York (city)—Metropolitan sewerage commission.

Sewerage and sewage disposal in the metropolitan district of New York and New Jersey. 550 p. Ill. 1910.

Considers especially sewerage systems of the metropolitan district and the present pollution of New York harbor. Very brief summary of possible disposal systems.

Newman, George.

Bacteriology of sewage and the bacterial treatment of sewage. 17 p. 2 dr. 9 ill. 1904. (In his Bacteriology and the public health, ed.3, p.151.)

Parkes, Louis C. & **Kenwood,** H. R.

Disposal of sewage. 32 p. 1907. (In their Hygiene and public health, ed.3, p.128.)

Reviews methods in best use.

Rafter, George W. & **Baker,** M. N.

Sewage disposal in the United States. Ed.3. 598 p. Ill. 1900.

Especially full in its account of experimental work, and descriptions of sewage works in operation in the United States.

Raikes, Hugh P.

Design, construction and maintenance of sewage disposal works. 414 p. Ill. 1908.

Based on British practice. Little attention paid to chemical and bacteriological features, but very complete on details of construction and operation.

Rideal, Samuel.

Sewage and the bacterial purification of sewage. 267 p. 1900.

Robinson, Henry.

Sewerage and sewage disposal. 192 p. 1896.

Aims to summarize experiments and practices actually carried out.

Sedgwick, William T.

On sewage as a vehicle of disease, its proper disposal and purification, the natural purification by fermentation and the living earth. 42 p. 1902. (In his Principles of sanitary science and the public health, p.123.)

Reviews methods briefly, especially that of intermittent filtration.

Staley, Cady, & **Pierson,** G. S.

Sewage disposal. 28 p. 1899. (In their Separate system of sewerage, its theory and construction, ed.3, p.296.)

Considers especially filtration of sewage and advantages of broad irrigation.

Venable, William Mayo.

Methods and devices for bacterial treatment of sewage. 236 p. Ill. 1908.

"Sources of information about sewage purification," p. 10-19.

Bacteriological principles briefly treated. Engineering features include both actual installations and suggested designs.

Waring, George E. *jr.*

Disposal of sewage. 19 p. 1876. (In his Sanitary drainage of houses and towns, ed.11, p.314.)

Brief description of irrigation practice.

Waring, George E. *jr.*

Modern methods of sewage disposal. Ed.2. 253 p. Ill. 1896.

Wood, Francis.

Sewage disposal. 55 p. Ill. 1901. (In his Sanitary engineering, p.181.)

Contains three chapters on history and methods of disposal of sewage and on sludge disposal.

Other References

Abbott, A. C.

Utilization of bacteria and bacteriologic methods in sanitary engineering. 6,800 w. 1900. (In Proceedings of the Engineers' Club of Philadelphia, v.17, p.47.)

Bacterial action in connection with the purification of sewage in the filtration and septic tank methods.

Advance in sewage disposal. 12,000 w. 1906. (In Transactions of the American Society of Civil Engineers, v.57, p.91.)

Informal discussion, opened by G. C. Whipple. Discusses different steps of sewage purification and varieties of methods in use.

Allen, Charles A.

Sewage disposal. 6,500 w. 1888. (In Transactions of the American Society of Civil Engineers, v.18, p.8.)

Discussion, 11,000 w.

Discusses plants observed in England and on the continent, chiefly chemical precipitation and broad irrigation works.

Alvord, John W.

Proper operation of sewage purification plants. 3,500 w. 1902. (In Engineering news, v.48, p.459.)

Suggestions for operation of septic tanks, contact beds and intermittent filters, with notes on plants built by the author.

Alvord, John W.

Sewage purification plants. 6,600 w. 19 dr. 14 ill. 1902. (In Journal of the Western Society of Engineers, v.7, p.113.)

Discusses principles and control mainly of septic tanks and contact beds, with cost comparisons.

Amyot, John A.

Nature of sewage and its proper disposal. 5,000 w. 1906. (In Proceedings of the Conference of Sanitary Officers of the State of New York, v.6, p.113.)

Describes briefly preliminary and final methods of treatment.

Annual reports of the state sewerage commissions of Connecticut and New Jersey. 2,700 w. 1901. (In Engineering news, v.45, p.229.)

Conclusions of the commissions regarding methods of disposal, with editorial comment.

Archibald, Douglas.

Comparison of chemical and septic tank systems as preludes to artificial filtration. 3,600 w. 1903. (In Journal of the Sanitary Institute, v.24, p.330.)

Considers advantages from points of view of removal of sludge, clogging, chemical purification and cost.

Arnold, C. M.

Sewage disposal and purification. 2,500 w. 1909. (In Canadian engineer, v.16, p.689.)

The same. (In Bulletin of the League of American Municipalities, v.10, p.301.)

Touches briefly on present-day practice and tendencies.

Bacterial treatment of London sewage and American sewage disposal problems. 1,800 w. 1901. (In Engineering news, v.45, p.65.)

Editorial review of conclusions of London commission and their application to American conditions.

Bacterial treatment of sewage. 2,000 w. 1898. (In Engineering, v.66, p.749.)

Editorial consideration of merits of septic tanks at Exeter and bacteria beds at Sutton, England.

Baker, M. N.

Bird's-eye view of some 25 British sewage works. 3,000 w. 1904. (In Engineering news, v.51, p.442.)

Baker, M. N.

Notes on sewage purification and public water supplies. 2,000 w.

Baker, M. N.—*continued.*

1906. (In Proceedings of the American Water Works Association, v.26, p.51.)

Discussion.

General discussion of methods and aims in sewage purification, giving concise explanations of methods in use and references to books.

Baker, M. N.

Recent visit to 24 British sewage works. 9,000 w. 1904. (In Journal of the Association of Engineering Societies, v.33, p.336.)

Discusses prevailing practice (1904) and ideas on sewage disposal in England, and briefly outlines methods in use at the plants visited.

Baker, M. N.

Sewage treatment in Great Britain and some comparisons with practice in the United States. 2,500 w. 1904. (In Engineering news, v.52, p.310.)

Consists of introduction to author's book, "British sewage works."

Barbour, F. A.

Work of the Royal sewage commission in sewage disposal in England. 4,200 w. 1909. (In Proceedings of the Indiana Engineering Society, v.29, p.185.)

Barwise, Sidney.

Purification of sewage. 4,500 w. 1898. (In Journal of the Sanitary Institute, v.18, p.545.)

Discussion, p.576.

Considers stages in the purification of sewage and the efficiency of different methods. Where little land is available, chemical precipitation with "alumino-ferric," with subsequent filtration on beds of stone or coal of carefully selected size, seems to the author most advisable.

Bechmann, M.

Sewage disposal in France. 4,000 w. 1904. (In Transactions of the American Society of Civil Engineers, v.54, pt.5, p.195.)

Review of ten years' progress, discussing the advance in disposal by broad irrigation, biological processes, and chemical and mechanical processes.

Bezault, B.

L'épuration biologique intensive des eaux d'égout; sa comparaison avec le procédé de l'épandage. 8,500 w. 1908. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.110, pt.1, p.23.)

Replies to paper by Vincey and defends biological treatment as against broad irrigation.

Bezault, B.

Épuration des eaux d'égout et des eaux industrielles. 10,000 w. 13 dr. 4 ill. 1906. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.108, p.506.)

Reviews bacterial methods of sewage disposal, with reference to English and French installations, especially to the author's experimental plant at Clichy-sur-Seine.

Bezault, B.

Épuration des eaux d'égout par le procédé biologique intensif; sa comparaison avec l'épandage. 12,000 w. 16 dr. 1908. (In Mémoires et compte rendu des travaux de la Société des ingénieurs civils de France, 1908, pt.2, p.1035.)

Favors bacteriological methods of purification rather than broad irrigation. Gives information concerning practice in England, Germany and America.

Birch, R. W. Peregrine

Examination of some recent experiments on sewage treatment made by Mr W. J. Dibdin, F. C. S., the Metropolitan board of works. 1,400 w. 1 diag. 1887. (In Engineering news, v.18, p.200.)

Paper before Society of Municipal Engineers and Surveyors.
Chiefly on interpretation of chemical analyses of sewage.

British view of the bacterial treatment of sewage. 1,200 w. 1903. (In Engineering news, v.50, p.375.)

Abstract of paper by Samuel Rideal at International Congress of Hygiene, Brussels.
Favors use of preliminary anaërobic treatment, followed by treatment on percolating filters with continuous aëration. Questions economy and efficiency of contact beds.

Bund, J. W. Willis-.

Suggested standard for effluents from sewage works. 1,600 w. 1889. (In Transactions of the Sanitary Institute, v.10, p.277.)

Considers subject from the point of view of effect on fish life.

Buxton, B. H.

Bacterial purification of sewage. 3,300 w. 1902. (In Engineering record, v.45, p.387.)

Extracts from paper in "Philadelphia medical journal."
Outlines successive steps in bacterial decomposition and purification, and briefly describes methods.

Campbell, K. F.

Experimental treatment of sewage containing trade waste at Huddersfield [England]. 6,000 w. 1 diag. 1903. (In Journal of the Sanitary Institute, v.24, p.497.)

Experiments with sewage containing a high percentage of woolen waste with septic tanks and chemical precipitation, and contact beds and trickling filters.

Cannon, H. Lemmoin-.

Some features of the fifth report of the Royal Commission on Sewage Disposal. 1,300 w. 1909. (In Journal of the Royal Sanitary Institute, v.30, p.58.)

Reviews conclusions of report, especially regarding preliminary treatment of sewage.

Cannon, H. Lemmoin-.

Work of the Royal Commission on Sewage Disposal. 4,000 w. 1909. (In Builder, London, v.97, p.311.)

Reviews briefly some of the conclusions, giving summary of commission's observations on different methods.

Chicago—Sanitary district, Board of trustees of.

Report of streams examination, chemic and bacteriologic, of the waters between Lake Michigan at Chicago and the Mississippi river at St. Louis for the purpose of determining their condition and quality before and after the opening of the drainage channel. [280 p.] 34 diag. 2 maps. 1902.

Purpose of the Chicago drainage channel is primarily the diversion of Chicago sewage from Lake Michigan into the Illinois river, and ultimately the improvement of navigation between Lake Michigan and the Mississippi. This report deals with self-purification of the Illinois river and concludes that "the sewage disposal problem of Chicago has been satisfactorily and scientifically solved."

Clark, H. W.

Bacterial purification of sewage. 4,400 w. 1899. (In Public health, v.25, p.187.)

Discussion, p.500.
Discusses action of bacteria in sewage purification and conditions favorable to them.

Clark, H. W.

Massachusetts experiments on the purification of fresh, stale and septic sewage. 5,800 w. 1898. (In Engineering news, v.40, p.75.)

Records recent (1898) work on bacterial methods of purification.

Clark, H. W.

Some data in regard to the comparative disposition of organic matter by sand, contact and sprinkling filters. 4,500 w. 1906. (In Public health, v.32, pt.2, p.154.)

The same. (In Engineering news, v.57, p.607.)

The same, condensed. 3,500 w. (In Municipal journal and engineer, v.23, p.188.)

Data obtained from experiments at the Lawrence Experiment Station.

Clark, H. W.

Some observations of methods, cost and results of sewage purification abroad. 9,000 w. 1 diag. 22 ill. 1908. (In Journal of the Association of Engineering Societies, v.41, p.231.)

Discussion, v.41, p.258; v.42, p.49. 6,000 w.

The same, condensed. 2,500 w. (In Engineering record, v.59, p.137.)

The same, condensed. 2,700 w. (In Municipal journal and engineer, v.26, p.125.)

Discusses British practice in sewage disposal as observed by author at many disposal plants, especially as it differed from American practice. Sewage farming, septic tanks, contact filters and sprinkling filters were observed.

Clark, H. W. & **Gage,** S. DeM.

Functions of various types of bacteria in the purification of sewage, with some methods for their quantitative determination. 6,500 w. 1905. (In Engineering news, v.53, p.27.)

Discussion of the processes of putrefaction, nitrification and oxidation, and denitrification, showing action and power of bacteria in producing ammonia from organic matter, reducing nitrates, liberating nitrogen, etc.

Clowes, Frank.

Bacterial treatment of sewage. 3,000 w. 9 ill. 1900. (In Nature, v.62, p.128.)

Discusses bacterial purification, giving illustrations of bacteria found in sewage.

Clowes, Frank.

Treatment of London sewage. 3,600 w. 1900. (In Journal of the Society of Arts, v.49, p.45.)

Discussion, 3,500 w.

Reviews history of disposal of London sewage and gives conclusions concerning the possibilities of bacterial treatment.

Collins, Clark P.

Sewage problem popularly stated; the battle of the microbes. 4,000 w. 1909. (In Scientific American supplement, v.67, p.126.)

Brief outline of methods in use.

Colloids in sewage purification. 1,000 w. 1908. (In Municipal journal and engineer, v.25, p.17.)

Shows influence of colloids on sewage purification and part played by surface action in the filters.

Committee report on sewage disposal in the United States. 8,500 w. 1909. (In Engineering-contracting, v.32, p.292.)

Portion of report for a committee of Trenton, N. J. Describes plants visited, including chemical precipitation plants at Providence, R. I. and Worcester, Mass., intermittent

Committee report on sewage disposal in the U. S.—*continued.*

sand-filtration plants at Worcester, Brockton, Mass. and Saratoga, N. Y., septic tanks and contact beds at Ballston Spa, N. Y., and percolating filters at Reading, Pa.

Connecticut sewerage commission on methods of sewage disposal. 2,500 w. 1901. (In Engineering record, v.43, p.274.)

Summary of 2d annual report, which gives conclusions on methods of disposal in use.

Construction of the Baltimore sewage disposal works. 5,000 w. 17 dr. 4 ill. 1909. (In Engineering record, v.60, p.545, 580.)

Deals especially with concrete and cement work, as used in the construction of filter beds, tanks, etc.

Cooper, C. H.

Notes on sewage treatment. 2,000 w. 1892. (In Transactions of the Sanitary Institute, v.13, p.204.)

Discusses purification by natural irrigation and filtration methods and by chemical precipitation.

Corfield, W. H.

Present state of the sewage question. 4,500 w. 1881. (In Transactions of the Sanitary Institute of Great Britain, v.3, p.70.)

Brief notice of disposal by intermittent filtration and by broad irrigation.

Cox, Arthur J.

Notes on sewage disposal in Europe. 5,000 w. 1903. (In Proceedings of the Iowa Engineering Society, v.15, p.70.)

Discussion of status and tendencies, especially in England.

Crimp, W. Santo.

Sewage treatment and sludge disposal. 5,500 w. 1 diag. 5 dr. 1893. (In Engineering record, v.27, p.237, 256, 277.)

The same, condensed. 2,400 w. (In Engineering news, v.29, p.198.)

Considers fluctuations in the flow of sewage, design of settling tanks, addition of chemical precipitant, amount of sludge from various British works, etc.

Davies, Stuart H.

Design of works for the bacterial treatment of sewage. 2,700 w. 1903. (In Engineering, v.76, p.500.)

Lays emphasis on importance of experiments with the particular sewage to be dealt with, of equalization of the sewage, retention of solid matter and of continuous action in filtration.

Davies, Stuart H.

Notes on the bacterial treatment of sewage. 1,200 w. 1906. (In Journal of the Royal Sanitary Institute, v.27, p.470.)

Abstract, discussing particularly value of residence of sewage in tanks, reduction of sludge and arresting of suspended matters.

Dibdin, William J.

Purification of the Thames. 10,000 w. 1897. (In Minutes of proceedings of the Institution of Civil Engineers, v.129, p.80.)

Discussion, 20,000 w.

The same, abstract. 2,000 w. (In Engineering record, v.40, p.53.)

Considers efficiency of purification by chemical precipitation and by filtration, and the pollution of the Thames.

Dibdin, William J.

Sewage-sludge and its disposal. 8,000 w. 1887. (In Minutes of proceedings of the Institution of Civil Engineers, v.88, p.155.)

Discussion, p.194.

The same, condensed. 2,600 w. (In Engineer, London, v.63, p.157.)

General consideration, advocating final disposal without attempt at utilization.

Dibdin, William J. & **Thudichum,** George.

Scientific basis of sewage treatment. 2,500 w. 1898. (In Journal of the Sanitary Institute, v.18, p.541.)

Discussion, p.576.

Emphasizes necessity of treatment by allowing natural agencies to act freely.

Discussion on modern methods of sewage disposal, with special reference to the elimination of suspended matters. 5,000 w. 1908. (In Journal of the Royal Sanitary Institute, v.29, p.1.)

Disposal of sewage. 2,000 w. 1909. (In Engineering, v.88, p.454.)

Editorial review of report of Royal Commission, giving results of its investigations.

Drying sewage sludge in centrifugal machines. 1,200 w. 2 dr. 1908. (In Engineering record, v.58, p.445.)

Describes machine built on the basis of certain German drying tests.

Dunbar.

Standards of purity for sewage effluents. 5,500 w. 1904. (In Journal of the Royal Sanitary Institute, v.25, p.599.)

The same, condensed. (In Builder, v.87, p.207.)

Decides that it is not possible to judge from results of a chemical analysis whether an effluent tends to putrefy. A safer judgment is based on the degree of purification already effected.

Dunbar.

Über moderne abwässer-reinigungsmethoden unter besonderer berücksichtigung des biologischen verfahrens. 11,300 w. 6 dr. 14 ill. 1906. (In Zeitschrift des Österreichischen Ingenieur- und Architekten-Vereines, v.58, p.633, 649.)

Discusses theory of sewage purification and describes various apparatus in use, especially devices for distribution of the sewage.

Easby, William, *jr.*

Bacterial treatment of sewage in England. 13,000 w. 6 dr. 3 ill. (In Proceedings of the Engineers' Club of Philadelphia, v.17, p.133.)

Describes principles and operation of septic tanks, contact beds, and Garfield coal filters at various plants in England.

Easdale, W. C.

Sewage disposal ideals. 6,000 w. 1910. (In Engineering record, v.61, p.504.)

The same, condensed. 3,500 w. (In Canadian engineer, v.18, p.318, 499.)

Paper before the Society of Engineers.

Discusses ideal conditions for operation of each type of plant, and ideal procedure at each step of construction and operation.

Eddy, Harrison P. & **Fales,** A. L.

Relation of the suspended matter in sewage to the problem of sewage disposal. 12,000 w. 14 ill. 1906. (In Journal of the Association of Engineering Societies, v.37, p.67.)

Discussion, 6,000 w.

Essential conditions of bacterial sewage purification. 3,500 w. 1898. (In Engineering record, v.38, p.404.)

Paper before the British Association for the Advancement of Science, by Dibdin and Thudichum.

Discusses effect of variations in air supply, temperature, light, acidity, time of contact, nature of bed material and depth of bed.

Experiments on sewage purification at the Lawrence Experiment Station during 1898. 1,400 w. 1899. (In Engineering news, v.42, p.395.)

Experiments with septic tanks and intermittent and contact filters.

Extensions of the Worcester [Mass.] sewage disposal works. 2,500 w. 9 dr. 1905. (In Engineering record, v.51, p.713.)

Description of sewage works "which are the most interesting as well as the most important in the country" (1905). New contact beds have been built for treatment additional to chemical precipitation.

Flagg, J. Foster.

Sewage disposal. 12,000 w. 1893. (In Paving and municipal engineering, v.4, p.313; v.5, p.1, 55, 119.)

Considers extent of use and relative advantages of disposal by discharge into rivers, chemical precipitation, broad irrigation, and by intermittent downward filtration preceded by precipitation. Describes various German and British works.

Flower, L.

Sewage treatment, more especially as affecting the pollution of the river Lee. 3,500 w. 1876. (In Journal of the Society of Arts, v.24, p.636.)

The same. (In Van Nostrand's eclectic engineering magazine, v.15, p.76.)

Notes on methods of disposal used by towns on the river Lee.

Fowler, Gilbert John.

Quality of effluents in relation to standards. 5,000 w. 1909. (In Journal of the Royal Sanitary Institute, v.30, p.513.)

Discussion, 5,400 w.

The same, condensed. 4,000 w. (In Canadian engineer, v.17, p.636, 665.)

Consideration of chemical meaning of standard tests, effect of effluents on streams, and value of standards in general.

Fowler, Gilbert John, & **Ardern,** Edward.

Suspended matter in sewage and effluents. 3,000 w. 1905. (In Journal of the Society of Chemical Industry, v.24, p.483.)

Considers mainly removal of colloidal matter from sewage.

Francis, Charles.

Sewage disposal and water purification. 3,500 w. 1897. (In Municipal engineering, v.13, p.340.)

Considers broad irrigation and intermittent downward filtration the only successful methods of purification.

Frankland, Percy.

Bacterial treatment of water and sewage up to date. 1,200 w. 1903. (In Minutes of proceedings of the Institute of Civil Engineers, v.154, supplement, p.153.)

The same. (In Engineer, London, v.96, p.29.)

The same. (In Engineering, v.76, p.32.)

Deals briefly with seven aspects and questions of sewage disposal on which experimental data should be collected.

Frankland, Percy.

Some recent results obtained in the practical treatment of sewage. 2,500 w. 1889. (In Transactions of the Sanitary Institute, v.10, p.271.)

Compares results of actual operation of plants using precipitation only with plants using precipitation with subsequent application to land.

Fuller, George W.

Comparative résumé of the sewage purification tests at Columbus, Ohio. 15,000 w. 1907. (In Journal of the Association of Engineering Societies, v.39, p.67.)

Discussion, 10,000 w.

Describes experimental work on preparatory treatment of sewage, septic tank treatment, intermittent sand filters, contact filters, sprinkling filters, etc.

Fuller, George W.

Composition of sewage in relation to problems of disposal. 9,800 w. 1903. (In Technology quarterly, v.16, p.132.)

Discusses composition of sewage from different English and American cities and its importance as affecting methods of disposal.

Fuller, George W.

Experimental methods as applied to water and sewage works for large communities. 6,500 w. 1906. (In Engineering record, v.54, p.80.)

General review of experimental studies of sewage treatment as carried on in various localities in the last 25 years.

Fuller, George W.

Modern sewage disposal plants of the world. 5,400 w. 2 ill. 1909. (In Journal of the Engineers' Society of Pennsylvania, v.1, p.3.)

Discussion, 3,000 w.

Outlines development of different methods of disposal and gives status of present methods.

Fuller, George W.

Notes on sludge disposal. 2,500 w. 1908. (In Engineering record, v.57, p.64.)

Emphasizes especially necessity of careful operation. Considers disposal of sludge from septic tanks.

See also editorial, p.58.

Fuller, George W.

Principles of sewage purification. 10,000 w. 1909. (In Engineering record, v.59, p.622, 657.)

Lecture at Cornell University. Considers degree of purification necessary and degree obtained by processes involving chemical precipitation, septic treatment, intermittent sand filters, contact filters and sprinkling filters.

Fuller, George W.

Sewage disposal in America. 16,000 w. 1904. (In Transactions of the American Society of Civil Engineers, v.54, pt.5, p.147.)

Discussion, p.207. 16,000 w.

The same. (Extract on septic treatment.) 3,000 w. (In Municipal engineering, v.29, p.36.)

Comprehensive review of status in 1904 and description of methods in use.

Fuller, George W.

What methods are most suitable for disposal of sewage on the Atlantic coast? 3,000 w. 1906. (In Engineering news, v.55, p.94.)

Paper before the New Jersey Sanitary Association.

Reviews recent advances in sewage disposal, discussing preliminary methods of treatment, intermittent filtration through sand, coarse-grained filters, etc.

Galton, Douglas.

Report of the Royal Commission on Metropolitan Sewage. 8,000 w. 1885. (In Journal of the Society of Arts, v.33, p.290.)

Discussion.

The same. (In Van Nostrand's eclectic engineering magazine, v.32, p.335.)

Historical review of disposal of London sewage and consideration of possible future methods and arrangements. Commission believes that sewage should not be allowed to flow into the Thames untreated.

Gerhard, William Paul.

Biological methods of sewage disposal for farm houses, country estates and summer resorts. 5,200 w. 12 dr. 1906. (In Metal worker, May 5, p.41.)

Considers use of septic or sedimentation tanks and contact beds and trickling filters.

Ginther, C. M.

Sewage purification. 1,500 w. 3 ill. 1904. (In Scientific American supplement, v.58, p.23, 952.)

Reviews history and methods, and describes briefly plant at Eastern Indiana Hospital for the Insane.

Glyndon, Albert.

Bacterial purification of sewage. 2,500 w. 5 ill. 1905. (In Scientific American, v.107, p.456.)

Brief review of methods in use.

Grandeau, L.

La purification des eaux potables et l'épuration des eaux d'égout en Angleterre. 16,000 w. 6 ill. 1905. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.107, p.64.)

Detailed review of practice and methods in use, with description of several purification works.

Gray, Samuel M.

Disposal of sewage. 47 p. 4 folding pl. 1884. (In his Proposed plan for a sewerage system and for the disposal of the sewage of the city of Providence, p.70.)

Describes instances of disposal for irrigation and considers precipitation methods.

Greater Pittsburg sewerage and sewage purification orders. 6,500 w. 1910. (In Engineering news, v.63, p.179.)

Outlines plans for metropolitan sewerage and sewage disposal system, following out orders of State board of health.

See also editorial, p.170. 2,000 w.

Gregory, John H.

Sewage testing station at Columbus, O. 2,400 w. 11 dr. 1904. (In Engineering news, v.52, p.359.)

The same. (In Engineering record, v.50, p.598.)

Describes equipment and arrangements for experimenting with different methods of sewage treatment.

Gretton, John O., *chairman.*

Report of the special committee appointed by common council to investigate the question of a sewage disposal plant for the city of Trenton, N. J. 44 p. 1909.

State sewerage commission required Trenton to cease polluting the Delaware before Jan. 1, 1911. Committee investigated various plants in eastern United States. No definite plans are recommended, but cost of maintenance is estimated at 15 cents per capita per year, or about $15,000.

Grimshaw, Harry.

Cost of some of the processes of sewage treatment. 4,600 w. 1892. (In Journal of the Society of Chemical Industry, v.11, p.5.)

Discussion, 3,000 w.

Compares only precipitation and electrolytic processes.

Grossmann, J.

Recovery of products of commercial value from sewage sludge.

Grossmann, J.—*continued.*

4,000 w. 1905. (In Journal of the Society of Chemical Industry, v.24, pt.1, p.655.)

Describes experiments and installation at Bradford, England, at which ammonium sulphate, phosphoric acid, fatty acids and other products are obtained by distillation of the sludge.

Harrison, W. H.

Bacteriological treatment of sewage. 7,500 w. 1900. (In Journal of the Society of Chemical Industry, v.19, p.511.)

Discusses working of septic tanks, contact beds and continuous filters, and conditions that increase their efficiency.

Hart, George A.

Relative merits of chemically-treated, settled, and septic sewage in preparing the liquid for oxidising beds. 2,000 w. 1907. (In Engineering, v.84, p.36.)

Paper before the engineering conference of the Institution of Civil Engineers.

Hatton, T. Chalkley.

Sewage disposal for small cities and towns. 3,300 w. 1904. (In Municipal engineering, v.27, p.331.)

Outlines various methods, showing that final choice should depend on local conditions.

Hazen, Allen.

Present European practice in regard to sewage disposal. 8,000 w. 1895. (In Journal of the Association of Engineering Societies, v.15, p.216.)

Interesting information on precipitation and filtration systems of England and on broad irrigation as practiced at Berlin and Paris.

Hazen, Allen.

Sewage disposal problem in American cities. 2,800 w. 1893. (In Public health, v.19, p.44.)

Shows that local conditions make different methods applicable in different cities.

Hedenberg, W. L.

Problem of sewage sludge disposal. 3,000 w. 1900. (In Municipal engineering, v.18, p.10.)

Finds difficulties in all methods discussed, but considers that utilization of sludge as fuel has possibilities of success.

Hering, Rudolph.

Bacterial processes of sewage purification. 4,500 w. 7 ill. 1898. (In Engineering magazine, v.15, p.960.)

Considers theory of bacterial action and early experimental work. Briefly describes methods in use in England at Exeter, Yeovil and Sutton.

Hering, Rudolph.

Disposal of sewage. 4,500 w. 1891. (In Engineering record, v.23, p.227, 243.)

Written for the California state board of health.

Reviews methods used previously, giving present (1891) status of the question.

Hering, Rudolph.

Fundamental principles of sewage purification on land. 15,000 w. 1909. (In Engineering news, v.61, p.493, 583, 605.)

Studies effect of physical conditions on filtration, considering the bacterial surface extent, degree of liquidity, air supply, rate of percolation, and discusses methods of distribution and application of the sewage to the filters.

Hering, Rudolph.

Sewerage work; a 25 years' review. 2,600 w. 1903. (In Engineering record, v.47, p.21.)

Includes brief summary of status of sewage disposal in 1903, and the developments leading to it.

Hering, Rudolph, & **Fuller,** G. W.

Sewage disposal at Chicago and vicinity. 10,000 w. 1907. (In Engineering record, v.55, p.130.)

Discusses results of disposal by dilution, as well as plans for partial disposal by use of septic tanks, intermittent sand filters, contact and sprinkling filters.

Hering, Rudolph, *and others.*

Disposal and purification of the sewage. 12 p. 1890. (In United States, 51st cong., 1st sess., House exec. doc. no.445: Report upon the sewerage of the District of Columbia, pt.2.)

The same, condensed. 2,000 w. (In Engineering news, v.27, p.476.)

Reviews possible methods of disposal and advocates discharge of sewage of Washington into the Potomac river.

Hermann, E. A.

Sewage purification. 3,400 w. 1900. (In Municipal engineering, v.19, p.195.)

Paper before the American Society of Municipal Improvements.

Discussion of relative advantages of broad irrigation, intermittent filtration and septic tanks.

Hill, A. Bostock.

Sewage contact beds declared superseded by percolating or sprinkling filters. 600 w. 1905. (In Engineering news, v.54, p.411.)

Extract from paper before the British Association of Managers of Sewage Disposal Works.

Hill, A. Bostock, & **Willcox,** J. E.

Practical considerations in connection with modern methods of treating sewage. 3,400 w. 1903. (In Journal of the Sanitary Institute, v.24, p.834.)

Discussion of relative advantages of methods depending on bacterial action, especially contact beds and percolating filters.

Hill, G. Everett.

Bacterial disposal of sewage. 6,800 w. 1905. (In Journal of the Franklin Institute, v.159, p.1.)

Considers the principles underlying bacterial sewage purification and their application to different methods.

Hofer, Thomas.

Ueber die reinigung städtischer abwässer und die reinigungsanlage der stadt Baden. 7,000 w. 1 dr. 1 ill. 2 pl. 1904. (In Zeitschrift des Österreichischen Ingenieur- und Architekten-Vereines, v.56, p.397, 409.)

Carefully reviews methods of purification as developed in England and America, and describes arrangement and operation of disposal plant at Baden, Austria, which consists of a septic tank combined with double contact beds.

Horetzky, Charles G.

On the most recent methods of sewage disposal now in operation in the United States; being to some extent the outcome of experiments made by the Massachusetts state board of health, with remarks upon their adaptability, in whole or in part, to cities in Canada. 5,000 w. 1898. (In Public health, v.24, p.51.)

Horetzky, Charles G.

Recent methods of sewage disposal. 3,300 w. 1898. (In Canadian engineer, v.6, p.157.)

Reviews working of some recent (1898) plants in America, with special regard to their application in Ontario. In favor of filtration through coke breeze before passing through sand filters.

Horton, Theodore.

Sewage disposal for institutions and small communities. 3,500 w. 1907. (In Municipal engineering, v.33, p.379.)

Discussion of nature of sewage and methods and degree of purification by septic tanks, intermittent filters, contact beds and sprinkling filters.

Horton, Theodore.

Sewage disposal for institutions and small communities. 4,800 w. 1907. (In New York—State department of health. Annual report (28th), pt.1, p.644.)

Outlines methods that have proved effective.

Johnson, George A.

Sewage treatment to prevent river pollution. 2,500 w. 1910. (In Engineering record, v.61, p.324.)

Considers degree of purification necessary in different localities.

Johnson, George A. *and others.*

Relative applicability of current methods for the determination of putrescibility in sewage effluents. 6,500 w. 1905. (In Public health, v.31, pt.2, p.80.)

Reviews incubator and chemical tests and considers the availability of oxygen when present in different forms.

Jones, Alfred Stowell, & **Travis,** W. O.

On the elimination of suspended solids and colloidal matters from sewage. 13,000 w. 13 dr. 1906. (In Minutes of proceedings of the Institution of Civil Engineers, v.164, p.68.)

Discussion.

Maintains that the process of sewage disposal is mainly the result of physical operations and that bacteria play a secondary part. Shows necessity for complete removal of suspended matters before final oxidation processes.

Kenwood, Henry R. & **Butler,** W.

Sewage purification and standards of purity. 5,500 w. 1901. (In Journal of the Sanitary Institute, v.22, p.97.)

Discussion, 7,000 w.

Discusses advances in purification and distribution of sewage by bacterial methods and maintains that a strictly chemical standard of purity is not satisfactory.

Kiersted, Wynkoop.

Discussion of the prevailing theories and practices relating to sewage disposal. 182 p. 1894.

Considers principles underlying sewage disposal rather than mechanical methods of treatment.

Kimberly, A. Elliott.

Report on examination of sewage purification plants, and supplementary reports on (1) disinfection of sewage effluents and (2) purification of acid iron wastes at Shelby. 406 p. Ill. 1908. (In Ohio—State board of health. Report of an investigation of water and sewage purification plants in Ohio, 1906/07, p.367.)

Information on disposal plants in many Ohio towns.

Kimberly, A. Elliott.

The use and the abuse of sewage purification plants. 5,400 w. 1907. (In Engineering record, v.56, p.234.)

The same, slightly condensed. (In Engineering news, v.58, p.235.)

Discussion of details of operation in the different methods of disposal.

Kinnicutt, Leonard Parker.

Present status of the sewage problem in England. 12,800 w. 9 ill. 1902. (In Journal of the Association of Engineering Societies, v.28, p.323.)

The same, condensed. 1,600 w. (In Engineering record, v.45, p.295.)

Discussion, 11,000 w.

Gives information on sewage plants inspected by author in England, with special reference to septic tanks, contact beds and intermittent continuous filtration, applying the sewage by means of sprinklers.

Kinnicutt, Leonard Parker.

Purification of sewage by bacterial methods. 10,700 w. 8 dr. 1900. (In Journal of the New England Water Works Association, v.15, p.119.)

Explanation of principle of bacterial purification and its application successively in intermittent filtration, contact and septic tank methods.

Kinnicutt, Leonard Parker.

Recent work in England on the purification of sewage. 3,000 w. 1898. (In Journal of the American Chemical Society, v.20, p.185.)

Describes work with bacteria beds at Sutton and with septic tanks at Exeter.

Kinnicutt, Leonard Parker.

Sewage analysis and the chemical treatment of sewage. 5,000 w. 1899. (In Engineering news, v.41, p.294.)

Considers significance of presence of various constituents in sewage and methods of determining the amount, methods of chemical treatment and their efficiency.

Kinnicutt, Leonard Parker.

Sewage disposal at Manchester and Birmingham. 2,500 w. 9 ill. 1906. (In Journal of the Association of Engineering Societies, v.36, p.123.)

Description of plants both using sedimentation and septic tanks for preliminary treatment. Subsequent treatment is by contact beds at Manchester and by percolating filters at Birmingham.

Landreth, Olin H.

Sewage disposal for cities and villages. 5,000 w. 1901. (In Proceedings of the Conference of Sanitary Officers of the State of New York, v.1, p.67.)

Discussion, 2,500 w.

Reviews briefly methods for purification of sewage.

Lane, F. E.

Hampton doctrine of sewage purification. 800 w. 1908. (In Municipal journal and engineer, v.25, p.639.)

Claims that purification of sewage is essentially a physical operation rather than bacterial.

La Rue, Benjamin F.

Sewage disposal. 2,500 w. 1 ill. 1898. (In Scientific American supplement, v.45, p.18743.)

From "Home study magazine."

Brief outline of methods that have proved satisfactory.

Latham, Baldwin.

Notes on sewage disposal. 6,000 w. 1905. (In Engineering news, v.54, p.666.)

Outlines history of sewage disposal and development of the different methods, with comparison of efficiency of contact beds and filters.

Lawton, C. E.

Bacterial treatment of sewage. 2,500 w. 1910. (In Canadian engineer, v.18, p.201.)

Paper before the Institute of Sanitary Engineers.

Reviews briefly construction and working of septic and precipitation tanks and contact beds.

Lea, R. S.

Sewage disposal. 12,000 w. 4 folding pl. 3 ill. 1900. (In Transactions of the Canadian Society of Civil Engineers, v.14, p.61.)

Concise but comprehensive survey of the various methods of sewage disposal in use or suggested, with special attention to bacterial methods.

Leeds sewage disposal experiments. 1,700 w. 1900. (In Engineering record, v.42, p.272.)

Gives results of experiments with various filtration methods, with preliminary use of septic tanks, etc.

Loewy, A.

L'épuration biologique des eaux d'égout sur sol artificiel. 26,000 w. 39 dr. 1 folding pl. 6 ill. 1910. (In Annales des ponts et chaussées, mémoires, ser. 8, v.46, p.7.)

Detailed summary of present practice in filtering sewage through artificial beds, especially comparing contact beds and percolating filters and describing preliminary treatment of the sewage. Describes a number of English plants and experiments carried out on Paris sewage.

London County Council.

Bacterial treatment of crude sewage; experimental treatment of London crude sewage in settling-tanks and coke-beds at Barking and Crossness. 150 p. 1902.

4th report, by Dr Clowes.

Gives results of important experiments on a large scale extending over four years. Recommends treatment of London sewage by bacterial methods.

London sewage disposal. 3,300 w. 1885. (In Sanitary engineer, v.11, p.350, 373, 433, 476.)

Reviews conclusions of the Royal Commission.

Lübbert, A.

Einführung in die frage der abwasserreinigung. 18,000 w. 28 dr. 1909. (In Zeitschrift des Vereines Deutscher Ingenieure, v.53, pt.1, p.26, 57, 135.)

General review of present practice, giving attention to dilution processes, mechanical removal of solid matters and methods for purification depending on bacteriological activity.

McCullough, Ernest.

Some notes on the cost of cinders for sewage filter beds. 2,200 w. 1904. (In Engineering news, v.52, p.136.)

Shows difficulties and expense met by author in securing supply of cinders.

Mackinnon, W. A.

Profitable sewage disposal. 500 w. 1909. (In Canadian engineer, v.17, p.61.)

Brief notice of process for extracting fats and fatty acids from sewage, leaving sludge cake that can be utilized as fertilizer.

Maguire, William R.

Sewage disposal. 19 p. 1896. (In his Domestic sanitary drainage and plumbing, ed.2, p.101.)

Manchester sewage disposal. 4,500 w. 1 dr. 1896. (In Engineer, London, v.81, p.306.)

Consideration of suggested methods, advocating discharge of tank effluent into the Mersey river 15 miles below Manchester.

Marston, A.

Sewage disposal in Iowa. 12,000 w. 2 diag. 15 dr. 5 ill. 1903. (In Journal of the Western Society of Engineers, v.8, p.638.)

Gives summary of sewage disposal plants in operation in Iowa, with brief descriptions.

Martin, Arthur J.

Management of sewage disposal works. 4,000 w. 1904. (In Journal of the Royal Sanitary Institute, v.25, p.660.)

Shows importance of automatic control of disposal methods.

Massachusetts—State board of health.

Disposal of sewage. 125 p. 3 dr. 3 ill. 7 maps. 1876. (In its Annual report (7th), 1876, p.276.)

Includes review of disposal methods depending on continuous and intermittent downward filtration, chemical precipitation and broad irrigation.

Massachusetts—State board of health.

Disposal of sewage. 34 p. 2 dr. 1877. (In its Annual report (8th), 1877, p.80.)

Reviews advances during the year and conditions at the time, showing the prevalence of different methods of disposal in use.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1895. 60 p. 1895. (In its Annual report (27th), 1895, p.443.)

Investigations of the permanency of sewage filters, preliminary treatment of sewage for removal of sludge, methods of aërating filters, methods of disposing of industrial wastes, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1896. 80 p. 1896. (In its Annual report (28th), 1896, p.425.)

Gives additional information on the purification of waste liquors from manufactories, including tannery and paper and woolen mill wastes, and on methods for sludge removal.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1897. 65 p. 1897. (In its Annual report (29th), 1897, p.393.)

Continued work on the purification of tannery sewage and paper mill and wool-scouring wastes, as well as on use of coke, ashes and cinders as filter material for domestic sewage.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1898. 53 p. 1898. (In its Annual report (30th), 1898, p.431.)

Beginning of study of septic tank and purification of tank effluents by intermittent sand filtration. Studies also removal of organic matter by straining through coke, action of iron in filters, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1899. 67 p. 1899. (In its Annual report (31st), 1899, p.415.)

Study of purification by septic tanks and contact filters, and continuation of other investigations.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1901. 43 p. 1901. (In its Annual report (33d), 1901, p.269.)

Experiments especially on the operation and efficiency of contact and other coarse filters, and comparison of the effluents of contact and intermittent continuous filters.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1902. 46 p. 1902. (In its Annual report (34th), 1902, p.177.)

Continued study of working of septic tanks, contact and intermittent continuous filters, with special attention to removal of solid matters.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1903. 58 p. 1903. (In its Annual report (35th), 1903, p.219.)

Experiments on the effect of length of stay of sewage in septic tank, and action of septic sewage on mineral salts in sewage, permanency of operation of contact filters, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1904. 82 p. 1904. (In its Annual report (36th), 1904, p.195.)

Contains special study of the storage of nitrogen in filters and its removal, with chemical changes during nitrification.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1905. 52 p. 1905. (In its Annual report (37th), 1905, p.339.)

Continues study of the changes in nitrogen of sewage and of the accumulation of nitrogenous matter in the sand filters.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1906. 92 p. 10 ill. 1906. (In its Annual report (38th), 1906, p.211.)

Includes study of operation of sprinkling filters, distribution of sewage and treatment of effluents from them, rates of filtration with sand filters, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence

Massachusetts—State board of health—*continued.*

Experiment Station during the year 1907. 54 p. 1907. (In its Annual report (39th), 1907, p.183.)

Continues study of distribution of sewage upon sprinkling filters and the refiltration of effluents from sprinkling filters.

Massachusetts—State board of health.

Review of 21 years experiments upon the purification of sewage at the Lawrence Experiment Station. 287 p. 20 diag. 1908. (In its Annual report (40th), 1908, p.251.)

Comprehensive review of very valuable investigations as to the operation of intermittent sand, contact and sprinkling filters, value of chemical precipitation and septic tank treatment, bacteriology of sewage purification, etc.

Mebus, Charles F.

Sewage purification, with notes on English and German works. 6,000 w. 1906. (In Proceedings of the Engineers' Club of Philadelphia, v.23, p.10.)

Describes briefly English works using chemical precipitation, contact and sprinkling filter method.

Mechanical aids to sewage purification. 2,000 w. 3 dr. 1900. (In Engineer, London, v.90, p.501.)

Describes automatic apparatus for distributing sewage over filter beds.

Meer, G. ter.

Schlammtrocknung für städtische kanalisationsanlagen. 4,700 w. 19 dr. 2 ill. 1908. (In Zeitschrift des Vereines Deutscher Ingenieure, v.52, p.180.)

Describes apparatus in use in several German cities, especially the Schäfer ter Meer centrifugal sewage-drying machine.

Michel, M.

Épuration des eaux usées. 15,000 w. 1906. (In Annales des ponts et chaussées, mémoires, ser. 8, v.21, p.60.)

Reviews development of methods of disposal as practiced in England and France.

Moncrieff, W. D. Scott-.

High nitrification in sewage filtrates. 2,000 w. 1900. (In Journal of the Sanitary Institute, v.20, p.653.)

Emphasizes great fertilizing value of sewage and urges attention to its legitimate use.

Moncrieff, W. D. Scott-.

Standardising of sewage. 4,000 w. 1903. (In Journal of the Sanitary Institute, v.24, p.460.)

Discussion, 2,400 w.

Believes that plans should be based on determinations of (1) depth of filter required for necessary purification, (2) quantity of air required, (3) proper rate of flow per unit area of filter, (4) proper period of rest between discharges.

Municipal sewage experiment stations. 3,000 w. 1907. (In Engineering news, v.57, p.243.)

Editorial discussion of amount and value of work done by sewage experiment stations in the United States, with suggestions for future work.

Müntz, A. & **Lainé,** E.

L'épuration des eaux d'égout. 1,500 w. 1907. (In Comptes rendus hebdomadaires des séances de l'Académie des sciences, v.144, p.466.)

Discussion of purification by filtration through peat filters.

Müntz, A. & **Lainé**, E.

Études sur l'épuration des eaux d'égout sur des lits bactériens de tourbe. 10,500 w. 1909. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.111, pt.1, p.721.)

Discussion of efficiency of peat filters for purifying sewage, with tests, concluding that peat possesses greater purifying activity than other materials used heretofore.

Müntz, A. & **Lainé**, E.

Sur l'utilisation de la tourbe pour l'épuration des eaux d'égout. 1,800 w. 1908. (In Comptes rendus hebdomadaires des séances de l'Académie des sciences, v.146, p.53.)

Authors have found peat a valuable agent in the nitrification of sewage in filter beds.

Murray, T. Aird.

Fifth report of the Royal Commission on Sewage Disposal, 1908. 11,500 w. 1908. (In Canadian engineer, v.15, p.865, 881.)

Review of this exhaustive inquiry into the most efficient methods of disposal.

Murray, T. Aird.

Modern aspects of sewage disposal and sewerage problems. 6,500 w. 1909. (In Canadian engineer, v.17, p.62.)

Paper before the Saskatchewan Medical Association.
Reviews past and present theories and methods of sewage disposal.

Murray, T. Aird.

Sewage disposal; removal of putrescibility. 20,000 w. 8 dr. 5 ill. 1909. (In Canadian engineer, v.17, p.145, 176, 236, 248, 259, 315, 345, 396, 590.)

Comprehensive review of advantages and shortcomings of different methods of sewage disposal. Concludes that from present indications filtration with use of revolving or traveling distributors is best adapted for use in Canada.

Need for a more rational view of sewage disposal. 3,000 w. 1910. (In Engineering news, v.64, p.394.)

Argues for purification only to the point of non-putrefaction.

New York (city), **Merchants Association.**

Battle of the microbes, nature's fight for pure water; a clear description of the methods of sewage disposal. 28 p. 3 ill. 1908.

Pamphlet giving brief outline of methods.

Nichols, William Ripley, & **Allen**, C. R.

Contributions to our knowledge of sewage. 1,600 w. 1885. (In Journal of the Franklin Institute, v.120, p.146.)

Gives analyses of Boston sewage.

Nolte, A.

Abwasserfrage und abwasserreinigung. 6,000 w. 1 diag. 25 dr. 1 ill. 1907. (In Stahl und eisen, v.27, pt.1, p.131, 166.)

Discusses theory and course of natural and artificial purification of sewage.

Ogden, H. N.

Investigation of sewage disposal plants. 115 p. 46 dr. 66 ill. 1907. (In New York—State department of health. Annual report (28th), 1907, pt.2, p.717.)

Describes methods and plants of 52 disposal works in New York state. Very fully illustrated.

Ogden, H. N.

Sewage disposal in the vicinity of London, England. 4,000 w. 1910. (In Engineering record, v.62, p.147.)

Outlines present-day tendencies in regard to use of septic tanks, sludge disposal and operation of sprinkling filters.

Ohio state board of health on septic sewage disposal. 2,100 w. 1901. (In Engineering record, v.43, p.97.)

Editorial review of report refusing permission to Columbus to dispose of sewage by septic tank treatment alone.

Papers on sewage purification read before the Glasgow International Engineering Congress. 5,500 w. 1901. (In Engineering news, v.46, p.272.)

Abstracts of papers by A. S. Jones, K. F. Campbell and A. B. McDonald, the first in favor of sewage farming, the last two in favor of chemical treatment in preference to septic tank treatment.

See also editorial, p.265.

Parry, W. Kaye.

Present position of the sewage problem. 3,000 w. 1903. (In Journal of the Sanitary Institute, v.24, p.349.)

Author shows the deficiencies in bacterial methods of disposal, and the difficulties still present in the way of sludge disposal.

Parry, W. Kaye.

Progress in sewage purification. 2,000 w. 1898. (In Builder, v.75, p.206.)

Paper before the Royal Institute of Public Health.

Claims that new methods have made little advance and that the only efficient method is by filtration, either naturally or through artificial filters.

Pearse, Langdon.

Sewage testing station of the sanitary district of Chicago. 5,000 w. 22 dr. 3 ill. 1910. (In Engineering news, v.63, p.367.)

Describes testing plant to anticipate future needs, containing septic, sedimentation and sludge tanks and sprinkling filters.

Phelps, Earle B.

Interpretation of a sewage analysis. 7,500 w. 1905. (In Technology quarterly, v.18, p.40.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.3.)

Reviews the different constituents to be determined and their relation to age and condition of the sewage. Refers only to crude and septic sewage.

Phelps, Earle B.

Interpretation of an analysis of the effluent from a sewage filter. 7,500 w. 1905. (In Technology quarterly, v.18, p.123.)

"References," p.141.

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.3.)

The same, condensed. 3,500 w. (In Engineering record, v.52, p.162.)

Considers standards of purity for sewage effluents, significance of the presence of different constituents, and tests of the purity of the effluent.

Philadelphia experiments in sewage disposal. 4,000 w. 7 dr. 10 ill. 1909. (In Municipal journal and engineer, v.27, p.621, 666.)

Preliminary description of experiments begun in 1908 on efficiency of contact and sprinkling filter processes, disinfection of sewage and sludge disposal.

Pittsburgh, Chamber of Commerce.

Sewage disposal for Pittsburgh; report of special committee on municipal sanitation. 30 p. 1907. (In its [Reports and addresses, 1907/08].)

Methods of disposal are considered in their applicability to the needs of Pittsburgh.

Potter, Alexander.

Advance in sewage purification. 4,500 w. 1906. (In Bulletin of the League of American Municipalities, v.6, p.140.)

The same, condensed. 3,000 w. (In Municipal engineering, v.31, p.439.)

Considers advance by legislative enactments, scientific development of methods, and official supervision of sewage plants.

Potter, Alexander.

Limits to sewage purification. 1,400 w. 1909. (In Municipal journal and engineer, v.27, p.514.)

Potter, Alexander.

Methods of sewage disposal. 2,500 w. 1909. (In Municipal engineering, v.36, p.362.)

Brief review of methods and their development.

Potter, Alexander.

Status of sewage disposal in America. 1,500 w. 2 dr. 8 ill. 1909. (In Municipal engineering, v.37, p.80.)

Comparison of British and American practice, showing how America may profit by experiments and failures abroad.

Pottevin, Henri.

L'épuration des eaux d'égout par les filtres à tourbe. 800 w. 1907. (In Comptes rendus hebdomadaires des séances de l'Académie des sciences, v.144, p.768.)

Brief note on tests to determine maximum rate of flow of sewage through peat filters and maximum percentage of nitrogenous matter that might be present in sewage before treatment.

Pratt, R. Winthrop.

Columbus sewage testing station. 1,200 w. 1905. (In Municipal engineering, v.29, p.34.)

Pratt, R. Winthrop.

Sewage purification, with special reference to the problem in Ohio. 12,000 w. 7 ill. 1905. (In Journal of the Association of Engineering Societies, v.34, p.310.)

Statistical descriptions are given of purification plants in ten Ohio towns of from 1,000 to 30,000 population.

Preece, William Henry.

Pure soil. 3,000 w. 1899. (In Journal of the Sanitary Institute, v.20, p.338.)

Extract from inaugural address.

The same, condensed. 1,800 w. (In Engineering news, v.42, p.171.)

Brief, interesting review of advances in sewage disposal, and status in 1899.

Preliminary conclusions of the British Royal Commission on Sewage Disposal. 800 w. 1901. (In Engineering news, v.46, p.111.)

Gives briefly probable conclusions as to the lands available for sewage treatment, efficiency of bacterial processes by themselves, and steps to be taken to secure better river protection.

Purification of sewage. 3,500 w. 1891. (In Engineering news, v.26, p.29.)

Abstract of pt.2 of report of the Massachusetts state board of health for 1890, giving information on operation and results of intermittent sand filtration.

Purvis, J. E. & **Coleman,** C. J.

Influence of the saline constituents of sea-water on the decomposition of sewage. 4,000 w. 1906. (In Journal of the Royal Sanitary Institute, v.56, p.367.)

The same. (In Engineering news, v.56, p.367.)

Rafter, George W.

Sewage disposal in the United States. 3,300 w. 2 dr. 5 ill. 1892. (In Engineering magazine, v.2, p.496.)

Review of progress in America and of plants in successful operation (1892).

Ransom, William.

Bacterial sewage disposal. 1,200 w. 1907. (In Minutes of proceedings of the Institution of Civil Engineers, v.171, p.391.)

Abstract, briefly describing successive stages in bacterial action upon sewage.

Rawlinson, Robert.

London sewerage and sewage. 8,000 w. 1 map. 1889. (In Journal of the Society of Arts, v.38, p.66.)

Discussion.

Traces history of disposal of sewage of London. Considers broad irrigation the most advantageous method.

Recent progress in sewage purification in England. 900 w. 1900. (In Municipal engineering, v.19, p.262.)

Abstract of paper by Gilbert J. Fowler before the American Society of Municipal Engineers.

Information on materials used in constructing filters and on progress with bacterial methods.

Reid, George.

Sewage disposal and the qualities essential in a sewage effluent. 3,600 w. 1903. (In Journal of the Sanitary Institute, v.24, p.90.)

Emphasizes practical side of the question, and advocates not too strict purification requirements.

Report of the Connecticut sewage disposal commission. 2,300 w. 1899. (In Engineering news, v.41, p.107.)

Shows status of question in Connecticut in 1899, and gives recommendations regarding pollution of streams and best methods of disposal.

Report on sewage disposal plants. 4,000 w. 2 ill. 1909. (In Municipal journal and engineer, v.27, p.287.)

Report to city of Trenton, N. J. Describes plants at Providence, R. I., Brockton, Mass., and Saratoga and Ballston Spa, N. Y.

Report on sewage purification experiments at Columbus, O. 5,000 w. 1906. (In Engineering news, v.55, p.367.)

Reviews results of first large-scale experimental tests of sewage disposal methods in America.

See also article, p.393. 3,000 w.

See also editorial, p.388. 2,000 w.

Report on the treatment of part of the sewage of Chicago and its relation to the Chicago drainage canal. 3,500 w. 1907. (In Engineering news, v.57, p.128.)

Reviews report by Rudolph Hering and George W. Fuller, considering available methods other than dilution for treating a part of Chicago's sewage. Discusses intermittent sand filters, contact beds and sprinkling filters, finding the last method the most advantageous.

Richou, G.

L'épuration bactérienne des eaux d'égout. 2,000 w. 2 dr. 1901. (In Le Génie civil, v.39, p.109.)

Reviews recent work in England with bacterial methods.

Rideal, Samuel.

Purification of sewage by bacteria. 7,000 w. 1897. (In Journal of the Society of Arts, v.46, p.81.)

Discussion, 3,500 w.

Takes up chronologically the different bacterial processes used, and discusses chemical action that takes place in the sewage after discharge into streams.

Rideal, Samuel.

Quality of sewage as influencing its mode of disposal. 6,400 w. 3 diag. 10 dr. 1899. (In Journal of the Sanitary Institute, v.19, p.686.)

Discussion, p.717.

Considers varying composition of sewage and progress of decomposition as affected by it.

Robinson, Henry.

Bacterial treatment of sewage. 1,500 w. 1903. (In Journal of the Sanitary Institute, v.24, p.349.)

Briefly discusses experiments for London County Council by Dibdin, and conclusions of the Royal Commission.

Robinson, Henry.

Sewage disposal. 3,200 w. 1885. (In Transactions of the Sanitary Institute of Great Britain, v.6, p.216.)

Discussion, p.239.

The same. (In Scientific American supplement, v.18, p.7460.)

Considers disposal by chemical precipitation, by land treatment and by dilution. Recommends disposal by filtration through artificial filters.

Robinson, Henry.

Sewage disposal. 2,600 w. 1889. (In Transactions of the Sanitary Institute, v.10, p.194.)

Reviews methods of purification by precipitation, electrolysis and filtration previous to 1889.

Roche, Antony.

Disposal of sewage. 1,800 w. 1906. (In Municipal journal and engineer, v.21, p.125.)

Outlines methods briefly.

Roechling, H. Alfred.

Sewage question during the last century. 10,500 w. 1901. (In Transactions of the Society of Engineers, v.41, p.193.)

Reviews different methods, paying particular attention to theoretical considerations.

Royal Commission on Sewage Disposal. 3,500 w. 1903. (In Builder, v.85, p.92.)

Review of conclusions of 3d report, as to advisability of land disposal method, practicability of bacterial processes and prevention of stream pollution.

Royal Commission on Sewage Disposal. 10,000 w. 1904. (In Engineer, London, v.98, p.348, 363, 388, 417.)

Review of 4th report, giving conclusions from careful study of conditions and practice in England at the time.

Royal Commission on Sewage Disposal. 7,500 w. 1910. (In Engineer, London, v.109, p.399, 426, 452.)

Review of the part of appendix 4 to 5th report dealing with preliminary methods of treatment and further treatment of the liquors obtained.

Royal Commission on Sewage Disposal. [5th report.] 10,000 w. 1908. (In Engineer, London, v.106, p.322, 342, 368, 393.)

See also editorial, p.325.

The same, condensed. 4,500 w. (In Builder, v.95, p.293.)

The same, condensed. 7,000 w. (In Engineering, v.86, p.348, 384.)

Condensed summary of detailed report based on extensive observation and expert evidence. Conclusion is that sewage can be brought to any desired degree of purity by application to either land or artificial filters.

Sackett, R. L.

Maintenance of sewage purification works. 1,600 w. 1909. (In Proceedings of the Indiana Engineering Society, v.29, p.201.)

Devoted chiefly to considerations of cost and permanency of filters and contact beds.

Schaefer-ter Meer's centrifugal drying machine for sewage sludge. 1,500 w. 3 dr. 2 ill. 1909. (In Engineering, v.88, p.528.)

Schreib, H.

Fortschritte in der reinigung der abwässer. 3,000 w. 1906. (In Chemiker zeitung, v.30, p.1111.)

Reviews status of sewage disposal in 1906, with special reference to Germany. Many references to patent and periodical literature.

Second and final report of the Royal Commission on the metropolitan sewage discharge of London. 2,700 w. 1885. (In Engineering news, v.13, p.248.)

Valuable report, reviewing results of the best study and investigation of English engineers up to 1885.

Second report of the Royal Commission on Sewage Disposal. 4,000 w. 1902. (In Engineering news, v.48, p.296.)

Abstract of report, dealing especially with efficiency of bacterial processes and the pollution of streams.

Sewage disposal experiments at Leeds [England]. 1,000 w. 1899. (In Engineering record, v.40, p.529.)

Brief record of experiments on purification by intermittent filtration, septic tanks and other methods.

Sewage disposal in England. 4,000 w. 1908. (In Municipal journal and engineer, v.25, p.497.)

Synopsis of 5th report of the Royal Commission, dealing with sedimentation and septic tanks, filters and standards for sewage effluents.

Sewage filtration. 1,500 w. 1906. (In Municipal journal and engineer, v.21, p.262.)

Discusses briefly availability of different methods, as steps in the purification of sewage.

Sewage; old and new systems...application of sewage to agriculture, purification of sewage. 2,200 w. 1869. (In Van Nostrand's eclectic engineering magazine, v.1, p.249.)

Sewage problem of western Pennsylvania. 1907. (In Proceedings of the Engineers' Society of Western Pennsylvania, v.23, p.263.)

Introductory, 800 w.

Administration of Pennsylvania laws respecting sewage, 4,200 w.

Present condition of municipal sewers of Pittsburgh. Three papers by Morris Knowles, F. Herbert Snow and I. Charles Palmer, respectively. Not directly on treatment of sewage, but included because of their application to local conditions.

Sewage purification. 3,400 w. 1903. (In Transactions of the American Society of Civil Engineers, v.51, p.415.)

Discussion by Rudolph Hering, George W. Rafter and L. J. Le Conte, mainly on advances in bacterial treatment.

Sewage purification and water pollution in the United States. 2,000 w. 1902. (In Engineering news, v.47, p.275.)

Gives list of 95 cities and towns which have adopted some method of sewage treatment, with statistics.

Sewage purification experiments at York, England. 3,300 w. 1902. (In Engineering record, v.46, p.222.)

Experiments on purification of the septic tank effluent by single and double contact beds, continuous and intermittent filters, etc.

Sewage purification in America. 90,000 w. Ill. 1892. (In Engineering news, v.28, p.32, 53, 77, 98, 127, 170, 196, 284, 308, 314, 340, 368, 422, 520, 545, 580, 611; v.29, p.26, 52, 122, 163, 183, 218, 248, 332, 520; v.30, p.41, 60, 86, 217, 239, 246, 477; v.31, p.25, 54, 66, 86, 190, 233, 498; v.32, p.420, 443; v.33, p.143, 292, 334, 387, 418; v.34, p.35.)

Serial description of sewage purification plants and experiment stations, with results of operation.

Sewage purification in Ohio. 3,000 w. 1908. (In Engineering record, v.57, p.235.)

Information from a preliminary report by R. Winthrop Pratt, chief engineer of the State board of health, summarizing conditions at different plants and discussing several disposal problems.

Sewage purification plants in Ohio. 2,500 w. 3 dr. 5 ill. 1905. (In Municipal engineering, v.28, p.279.)

Briefly describes chemical precipitation plants at Canton, Alliance and Glenville, and various plants using intermittent filtration and septic tanks.

Sewage testing apparatus. 1,500 w. 2 dr. 1907. (In Municipal journal and engineer, v.22, p.334.)

Describes Scott-Moncrieff apparatus for testing sewage treatment materials and methods.

Sewage treatment at Worcester [Mass.]. 2,500 w. 4 ill. 1907. (In Municipal journal and engineer, v.22, p.20.)

Reviews results of treatment in 15 years' use of sedimentation, chemical precipitation, septic tank treatment and filtration.

Sewerage problem of greater Pittsburgh. 3,500 w. 1910. (In Engineering record, v.61, p.183.)

Discusses plans for comprehensive system of sewerage and sewage disposal, in accordance with decree of the State board of health.

Shenton, Henry C. H.

Latest practice in sewage disposal. 7,200 w. 1 folding pl. 1904. (In Transactions of the Society of Engineers, v.44, p.41.)

Discussion, 6,500 w.

The same, condensed. 3,400 w. (In Engineering record, v.49, p.630.)

Careful comparison of different methods and their efficiency.

Shields, W. S.

Filters *versus* contact beds in sewage purification. 3,000 w. 8 dr. 1 ill. 1904. (In Proceedings of the Indiana Engineering Society, v.24, p.119.)

The same. (In Municipal engineering, v.26, p.111.)

Considers opinions of English authorities on efficiency of contact beds. Describes small plant of the Allis-Chalmers Co. at West Allis, Wis., consisting of a septic tank and anaërobic and aërobic filters.

Shields, W. S.

Purification of sewage. 2,500 w. 1902. (In Municipal engineering, v.22, p.388.)

The same, slightly condensed. (In Engineering news, v.47, p.95.)

The same, slightly condensed. (In Engineering record, v.45, p.129.)

Paper before the Illinois Society of Civil Engineers and Surveyors.

Gives instances and data from author's experience in operation of septic tanks, contact beds and sand filters.

Smith, C. Chambers.

Economy in sewage disposal. 2,700 w. 1910. (In Canadian engineer, v.19, p.456.)

Paper before the Royal Sanitary Institute Congress.

Notes especially on design of sprinkling filter plants and disposal of sludge.

Smith, Solon C.

Sewerage and sewage disposal. 4,000 w. 1901. (In Municipal engineering, v.21, p.85.)

Paper before the Ohio Institute of Mining Engineers.

Discusses action of bacteria in disposal of sewage, filtering materials, and efficiency of bacterial methods.

Snow, F. Herbert.

Bacteriological treatment of sewage. 13,000 w. 1905. (In Proceedings of the Engineers' Club of Philadelphia, v.22, p.293.)

Discussion.

Historical development of sewage disposal methods depending on bacterial action. Describes briefly plants at Brockton, Mass., Saratoga Springs, N. Y., Mansfield, O. and Atlantic City, N. J.

Some British sewage disposal apparatus. 900 w. 3 ill. 1906. (In Engineering record, v.53, p.155.)

Description of distributing devices for continuous filters and automatic gear for controlling contact beds.

Sommerville, David.

Some observations on the chemistry and bacteriology of sewage purification. 7,500 w. 1909. (In Transactions of the Society of Engineers, v.49, p.175.)

Discussion of chemical and bacterial action that takes place in the disposal of sewage.

State control of sewage disposal works. 1,400 w. 1908. (In Engineering news, v.60, p.179.)

Editorial emphasizing need of central control in prevention of stream pollution and in the designing and operation of disposal works.

Stearns, Frederic P.

Disposal of sewage in Massachusetts. 1,800 w. 1888. (In Transactions of the American Society of Civil Engineers, v.18, p.1.)

Shows status of sewage disposal in 1888 and previous action of the state on this question.

Sweetman, G. Drysdale.

Natural methods for the purification of water-carried sewage. 8,000 w. 12 dr. 1899. (In Transactions of the Institution of Junior Engineers, v.10, p.53.)

Reviews sewage treatment methods by broad irrigation, intermittent filtration, contact beds, continuous filtration and in septic tanks.

Thresh, John C.

Standards for sewage effluents. 1,500 w. 1910. (In Engineering record, v.61, p.185.)

From paper before the Association of Managers of Sewage Disposal Works of England.

Discusses standards and considers that suggested by Prof. Phelps the best, the tinting of the effluent in a small stoppered bottle with methylene blue. The length of time before the blue color disappears indicates the relative stability of the effluent.

Tidy, C. Meymott.

Treatment of sewage. 45,000 w. 1886. (In Journal of the Society of Arts, v.34, p.1127.)

Discussion, v.34, p.664; v.35, p.41, 73.

The same, condensed. 11,000 w. (In Van Nostrand's eclectic engineering magazine, v.35, p.1.)

Reviews at considerable length the whole question, taking up each method then (1886) used.

Treatment and utilization of sewage. 6,000 w. 1869. (In Van Nostrand's eclectic engineering magazine, v.1, p.1033.)

Abstract of report to the British Association for the Advancement of Science.

Statistics are given as to systems of sewerage in use in England and other countries.

Trenton (N. J.)—Common council—Committee on sewage disposal.

Report of the special committee appointed to investigate the question of a sewage disposal plant for the city of Trenton, N. J. 44 p. 1909.

Pamphlet outlining methods of sewage disposal and describing practice at Providence, R. I., Worcester and Brockton, Mass., Saratoga and Ballston Spa, N. Y. and Reading, Pa. Advocates adoption of "a method whose principal feature is the sprinkling filter."

Tuttle, F. W.

Problems to be solved in the treatment of Hyde Park [Kan.] sewage. 4,000 w. 1893. (In Journal of the Association of Engineering Societies, v.12, p.501.)

Discusses possible methods and favors broad irrigation or intermittent filtration or the two methods combined.

Valentine, A. H.

Distillation of sewage sludge. 600 w. 1910. (In Journal of the Society of Chemical Industry, v.29, pt.1, p.244.)

Abstract, describing experiments of the author to determine character of the products of distillation, nature of the residue, and conditions for obtaining best results.

Vincey, Paul.

Épuration biologique des eaux d'égout; dégroïssage mécanique et fosses septiques, champ d'épandage et lits artificiel. 16,000 w. Diag. 1907. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.109, pt.2, p.1343.)

Discusses purification of sewage as taking place in septic tanks, sewage farms and artificial beds, giving special attention to careful experiments carried out at Paris and Lille, France, and Columbus, Ohio.

Vrooman, Morrell.

Sewage disposal. 8,000 w. 1904. (In Bulletin of the League of American Municipalities, v.2, p.72.)

General review of development and demands of the subject and of methods of disposal.

Waring, George E. *jr.*

Disposal of sewage. 3,000 w. 1884. (In Public health, v.10, p.174.)

General discussion of sewage application to the soil, either for irrigation or filtration.

Waring, George E. *jr.*

Sewage disposal. 4,000 w. 1894. (In Engineering record, v.29, p.222, 288; v.30, p.7, 26.)

Includes brief summary of four methods.

Warington, Robert.

Some practical aspects of recent investigations on nitrification. 5,000 w. 1882. (In Journal of the Society of Arts, v.30, p.532.)

Discussion, 3,000 w.

Includes consideration of the nature of the purifying action of soil on sewage, and the successive steps.

Watson, John D.

Drainage of a country house. 6,000 w. 1910. (In Canadian engineer, v.18, p.270, 293.)

The same, condensed. 3,500 w. (In Engineering record, v.60, p.681.)

Paper before the Institute of Sanitary Engineers.

Outlines preliminary investigations to be carried on and gives information on use of septic tanks, contact beds and percolating filters.

Watson, W. M.

Oxygen system of sewage purification. 700 w. 1898. (In Canadian engineer, v.5, p.346.)

System of the Sewage Purification Company of Dublin, Ireland, in which oxygen for oxidation of micro-organisms is supplied by addition of sodium nitrate.

Webster, George S.

Sewage purification works visited in Europe. 3,500 w. 1909. (In Proceedings of the Engineers' Club of Philadelphia, v.26, p.48.)

Reviews five methods of sewage treatment observed in European practice, with brief comment on their applications.

West Riding rivers. 35,000 w. 1906. (In Engineering, v.81, p.70, 176, 236, 298, 374, 442, 606, 746, 814.)

Detailed history of the disposal of the sewage of Bradford, England.

Wike, Charles F.

Experiments in sewage treatment at Sheffield [England]. 2,000 w. 1903. (In Journal of the Sanitary Institute, v.24, p.515.)

Experiments indicate that satisfactory purification can be obtained by simple settlement of sewage, followed by treatment in double contact beds.

Wilson, Elmina T.

Disposal of sewage. 6,000 w. 19 dr. 1906. (In his Modern conveniences for the farm home, Farmers bulletin, no.270, p.22.)

The same, condensed. 1,800 w. (In Metal worker, v.67, April 27, p.54.)

Describes disposal by surface and sub-surface irrigation and by filtration through prepared beds.

Winslow, Charles-Edward Amory.

Disposal of sewage. 4,500 w. 1907. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.4.)

Paper before the 9th annual school for instruction of health officers, Burlington, Vt. Reviews modern methods, indicating degree of success attained.

Winslow, Charles-Edward Amory.

Scientific disposal of city sewage; historical development and present status of the problem. 7,000 w. 1905. (In Technology quarterly, v.18, p.317.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.3.)

Traces development of sewage disposal by methods in use.

Winslow, Charles-Edward Amory.

Winter visit to some sewage disposal plants in Ohio, Wisconsin and Illinois. 6,600 w. 10 ill. 1905. (In Journal of the Association of Engineering Societies, v.34, p.335.)

Discussion, 2,500 w.

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.3.)

Briefly describes plants and results of operation. Particular attention to septic tank treatment followed by contact or intermittent filtration.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

Experiments on the purification of Boston sewage, 1903–05. 4,500 w. 1905. (In Public health, v.31, pt.1, p.16.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.3.)

Experiments with septic tank, intermittent sand filter and contact bed, with chemical analyses of crude sewage and of effluent. Best results were obtained by treatment in double contact beds.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

Investigations of the purification of Boston sewage, with a history of the sewage-disposal problem. 163 p. 15 diag. 6 dr. 1906. (In United States—Geological survey. Water-supply and irrigation papers, no.185.)

Bibliography, p.149.

Investigations at the sewage experiment station of the Massachusetts Institute of Technology on methods using septic tanks, sand and contact filters.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

New sewage experiment station of the Massachusetts Institute of Technology. 2,200 w. 3 dr. 2 ill. 1910. (In Engineering news, v.63, p.652.)

Describes experimental equipment, including distributing tank, three trickling filters, septic tank, sand filter, sedimentation tank for effluents and a Dibdin slate bed.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

Purification of Boston sewage; experimental results and practical

Winslow, Charles-Edward Amory, & **Phelps,** E. B.—*continued.*
possibilities. 6,000 w. 1908. (In Journal of the Association of Engineering Societies, v.40, p.28.)

Discussion, p.297.

The same, condensed. 2,200 w. (In Engineering record, v.56, p.607.)

Describes experiments at the sewage experiment station of the Massachusetts Institute of Technology with septic tanks and sprinkling filters. If further purification is desired, disinfection by addition of chlorid of lime is recommended.

Wurl, Wilhelm.

Maschinelle abwasser-reinigungs-anlagen. 7,000 w. 35 dr. 19 ill. 1910. (In Glaser's annalen für gewerbe und bauwesen, v.66, p.113.)

Very fully illustrated account of mechanical devices in use at German sewage disposal plants.

Treatment by Special Methods

Broad Irrigation

General

Agricultural use of sewage. 2,000 w. 1910. (In Municipal journal and engineer, v.29, p.150.)

From paper by J. A. Volecker before the Association of Managers of Sewage Disposal Works.

Considers sewage and sewage sludge to be of doubtful value as a fertilizer.

Allen, Charles A.

Sewage disposal. 6,000 w. 1888. (In Transactions of the American Society of Civil Engineers, v.18, p.8.)

Discussion, 7,000 w.

Reviews briefly history of sewage purification in England, mainly by irrigation. Considers application of similar methods in Worcester, Mass., and effect of the low temperature in winter.

Barlow, Crawford.

London sewage question. 7,500 w. 1890. (In Iron, v.36, p.142, 162.)

Paper before the Association of Municipal and Sanitary Engineers and Surveyors.

Reviews suggested methods of disposal. Considers methods in use at Paris and Berlin, and favors land disposal at London.

Bazalgette, C. Norman.

Sewage question. 56 p. 2 folding pl. 1877. (In Minutes of proceedings of the Institution of Civil Engineers, v.48, p.105.)

Discussion, v.48, p.160; v.49, p.175. 130 p.

The same, without discussion. (In Van Nostrand's eclectic engineering magazine, v.17, p.106, 213.)

Reviews and classifies systems of disposal, with conclusion that for cities not situated on the seaboard or on tidal rivers broad irrigation is the best method.

Carpenter, Alfred.

Utilisation of town sewage by irrigation. 16,000 w. 1887. (In Journal of the Society of Arts, v.35, p.221.)

Discussion.

Reply to paper by Tidy. Author favors sewage irrigation and gives much valuable information as to results obtained by it.

Davies, A. M. & **Tyndale,** W. C.

Sewage disposal on chalk soils. 5,500 w. 1904. (In Journal of the Royal Sanitary Institute, v.25, p.643.)

Considers value of chalk as a filtering material in cases of sewage farming.

Hope, W.

Can sewage be utilised as well as purified? 4,300 w. 1876. (In Journal of the Society of Arts, v.24, p.624.)

Argues that "complete purification and complete utilisation necessarily go hand in hand."

Janin, George.

Purification of sewage by means of the soil. 5,400 w. 2 folding pl. 1900. (In Transactions of the Canadian Society of Civil Engineers, v.14, p.47.)

Discusses theory of soil purification of sewage and describes the Paris sewage farms and the farm of St. Laurent College.

Jones, Alfred Stowell.

Vital difference between well-managed and neglected sewage farms. 2,000 w. 1894. (In Journal of the Sanitary Institute, v.15, p.628.)

Latham, Baldwin.

Utilisation of sewage. 15,000 w. 1866. (In Transactions of the Society of Engineers, v.6, p.68.)

Discussion.

Gives instances of results obtained from applying sewage to irrigation purposes.

Lawes, J. B. & **Gilbert,** J. H.

On the composition, value and utilization of town sewage. 18,000 w. 1866. (In Journal of the Chemical Society of London, v.19, p.80.)

Considers the crops to which sewage is best adapted and shows results from its use in broad irrigation.

Management of sewage farms. 1,900 w. 1900. (In Engineering record, v.42, p.108.)

Review of paper by H. Royle before the Association of Municipal and County Engineers.

Gives suggestions for arrangement and operation of farms, based on author's extensive experience.

Rafter, George W.

Sewage irrigation. 200 p. Ill. 1897. (In United States—Geological Survey. Water-supply and irrigation papers, no.3, 22.)

"Publications relating to sewage utilization and disposal," no.22, p.89–98.

Brief review of advantages of different systems of disposal. Describes sewage farms operated in Europe and America.

Raising crops on sewage filter beds. 1,500 w. 1896. (In Engineering news, v.35, p.391.)

Shows results obtained at Pullman, Ill., Berlin, Ont. and South Framingham, Mass.

Roechling, H. Alfred.

Present status of sewage irrigation in Europe and America. 5,500 w. 2 folding pl. 1896. (In Journal of the Sanitary Institute, v.17, p.483.)

Discussion.

Scoble, Herbert T.

Land treatment of sewage; a digest of the reports made to the Royal Commission on Sewage Disposal by their specially-appointed officers. 76 p. [1909.]

Reprinted from the "Surveyor and municipal and county engineer."

This commission was appointed in 1898 to investigate methods of sewage disposal. The reports here considered deal with eight selected typical sewage farms conducted under varying local conditions. Comparison not given. Value is in exhaustive information relating to each separately.

Scott, Henry Y. D.

On the effects of the long-continued application of sewage water to the same land. 4,600 w. 1879. (In Transactions of the Sanitary Institute of Great Britain, v.1, p.150.)

Sewage and irrigation works in Germany. 4,500 w. 1878. (In Builder, v.36, p.1267.)

The same. (In Van Nostrand's eclectic engineering magazine, v.20, p.262.)

Gives results of operation of works at Danzig and briefly describes the Berlin plant under construction.

Some observations of sewage farming in England. 3,800 w. 1904. (In Engineering news, v.51, p.385.)

Editorial discussion and description of three sewage farms.

Swan, Charles H.

Notes on European practice in sewage disposal. 3,400 w. 1888. (In Journal of the Association of Engineering Societies, v.7, p.248.)

Shows favorable results of sewage irrigation at Berlin, Paris and in British towns.

Tucker, William C.

Sewage disposal system for a country-house. 700 w. 1 pl. 1902. (In American architect, v.75, p.61.)

Method of disposal is by sedimentation and irrigation.

Use of sewage for irrigation in the West. 2,000 w. 1893. (In Engineering news, v.29, p.180.)

Editorial review of extent and value of sewage irrigation in the Western states.

Waring, George E. *jr.*

Area needed for sewage disposal by irrigation. 2,600 w. 1894. (In Engineering news, v.31, p.143.)

Waring, George E. *jr.*

Partial purification of sewage. 2,000 w. 1894. (In Engineering news, v.31, p.15.)

Partial purification only is obtained by chemical precipitation methods. Purification by irrigation can be carried to the same degree, with considerable reduction of cost.

Waring, George E. *jr.*

Sewage disposal. 36 p. 3 folding pl. 1896. (In his Sewerage and land-drainage, ed.4, p.229.)

Describes several American sewage irrigation works constructed by the author.

Waring, George E. *jr.*

Sewage disposal at Wayne, Pa. 2,500 w. 1 dr. 2 ill. 1892. (In American architect, v.37, p.5.)

Satisfactory purification by surface irrigation.

Watson, W. M.

Purification of sewage by irrigation. 1,700 w. 1898. (In Canadian engineer, v.6, p.151.)

Explains principles of sewage irrigation and claims that its success as a method of disposal has been more apparent than real.

Watson, W. M.

Purification of sewage by mixing with pure water. 1,300 w. 1898. (In Canadian engineer, v.6, p.160.)

Includes brief consideration of dangers of sewage farms.

Individual Farms

Aldershot Camp sewage farm. 5,000 w. 3 dr. 2 ill. 1900. (In Engineering, v.70, p.693.)

Describes successful British sewage farm, emphasizing importance of careful supervision as shown in its past history of 45 years.

Allin, T. D.

Pasadena, Cal. sewer farm. 2,200 w. 1905. (In Engineering record, v.51, p.154.)

Describes a farm very successful from both the sanitary and the financial point of view.

Bassell, Burr.

Operation of the Los Angeles outfall sewer and sewage irrigation. 7,800 w. 1897. (In Journal of the Association of Engineering Societies, v.19, p.45.)

Contains information on results of operation of sewage farms at Los Angeles and Pasadena.

Bechmann & Launay.

Notice sur l'état actuel de l'assainissement de Paris. 20,000 w. 1895. (In Annales des ponts et chaussées, mémoires, ser. 7, v.9, p.257.)

Considerable space devoted to description of sewage farms of Paris.

Bechmann & Launay.

Notice sur les travaux de l'aqueduc et du parc agricole d'Achères. 70,000 w. 1 diag. 20 dr. 1897. (In Annales des ponts et chaussées, mémoires, ser. 7, v.13, 2e trimestre, p.6.)

Detailed description of disposal system of Paris, including short account of sewage farms at Achères.

Broad irrigation sewage farm at Fresno, California. 1,500 w. 3 ill. 1908. (In Engineering record, v.58, p.207.)

Preliminary treatment of sewage in septic tank.

Carpenter, Alfred.

Financial account of the Beddington sewage farm. 2,000 w. 1876 (In Journal of the Society of Arts, v.24, p.614.)

Describes results under poor management.

Claye, Alfred Durand.

L'assainissement de la Seine. 10,000 w. 1885. (In Annales des ponts et chaussées, mémoires, ser. 6, v.10, p.477.)

The same, abstract translation. 750 w. (In Engineering news, v.13, p.391.)

Shows successful results of experiments in broad irrigation with Paris sewage at Gennevilliers.

Diversion and purification of the sewage of Paris. 2,800 w. 1 dr. 1899. (In Engineer, London, v.88, p.510.)

Shows status of sewage irrigation in 1899.

Dumas, A.

État actuel de l'assainissement de Paris. 8,500 w. 9 dr. 1 pl. 1896. (In Le Génie civil, v.28, p.260, 277.)

Includes description of sewage farms of Paris at Gennevilliers, giving extent and cost of maintenance.

Ellithorpe, Robert H.

Disposal of sewage by irrigation. 1,700 w. 8 ill. 1909. (In Engineering review, New York, v.19, April, p.33.)

Considers chiefly sewage farm at Fresno, Cal.

État actuel de l'assainissement de Paris; inauguration des travaux d'achèvement. 3,200 w. 5 dr. 1899. (In Le Génie civil, v.35, p.188.)

Gives history of disposal of sewage of Paris by broad irrigation methods since 1895, showing extent of sewage farms and method of distribution.

Flagg, J. Foster.

Progress made in the purification of the sewage of Paris. 5,000 w. 1 dr. 1896. (In Engineering record, v.35, p.5.)

Letter giving details concerning operation of sewage farms of Paris.

Fuertes, James H.

Notes on the Berlin sewage farms. 600 w. 5 dr. 1899. (In Engineering record, v.40, p.30.)

Fuertes, James H.

Sewerage of Nottingham, Eng. 1,300 w. 2 dr. 1898. (In Engineering record, v.38, p.142.)

Sewage is applied very successfully to broad irrigation.

Harvey, T. Fletcher.

Merthyr sewage farms. 3,000 w. 1908. (In Journal of the Royal Sanitary Institute, v.29, p.648.)

Describes operation of successful sewage farm in England.

Hazen, Allen.

Visit to a new sewage farm at Berlin. 1 diag. 9 ill. 1897. (In Engineering news, v.38, p.178.)

Farm receives all of Berlin's sewage. Description of distribution systems and statement of average cost of preparing land.

Holder, Charles F.

Scientific disposition of sewage. 1,700 w. 1904. (In Scientific American, v.105, p.278.)

Describes successful results from broad irrigation at Pasadena, Cal. Special success was found with an English walnut crop.

King, George.

Irrigation with town sewage. 10,000 w. 1865. (In Transactions of the Society of Engineers, v.5, p.106.)

Detailed description of sewage irrigation as practiced at Edinburgh, Scotland, considering extent, costs and results.

Launay, F.

Note sur l'assainissement de la ville de Berlin en 1894. 14,000 w. 3 folding pl. 1895. (In Annales des ponts et chaussées, mémoires, ser.7, v.10, p.257.)

Detailed study of operation of sewage farms of Berlin and results obtained.

Marten, Edward Dimmack.

On the sewage and sewage disposal works of the borough of Dudley. 3,500 w. 2 dr. 1891. (In Minutes of proceedings of the Institution of Civil Engineers, v.104, p.238.)

Describes a satisfactory case of sewage irrigation.

Mohun, E.

Sewage disposal at provincial gaol, Victoria, B. C. 1,100 w. 4 dr. 1903. (In Transactions of the Canadian Society of Civil Engineers, v.17, p.432.)

Successful sewage farm is maintained, with previous treatment of sewage in septic tank.

Muller, Alexander.

Effluent from the Berlin sewage-irrigation works. 1,800 w. 1886. (In Van Nostrand's eclectic engineering magazine, v.35, p.37.)

From "Gesundheits-ingenieur."

Chemical tests show effluent to be quite impure.

New sewage farm for the St. Denis ward of Montreal. 800 w. 2 dr. 1900. (In Engineering news, v.43, p.54.)

Pakes, W. C. C.

Johannesburg municipal sewage scheme from a biochemical point of view. 5,000 w. 1906. (In Journal of the Chemical, Metallurgical and Mining Society of South Africa, v.6, p.241.)

Discussion, 2,500 w.

Considerable attention to condition of the effluent from the septic tank, and possibilities of success of broad irrigation.

Pearson, S. F.

Pasadena sewer farm. 2,000 w. 5 ill. 1906. (In Municipal journal and engineer, v.20, p.385.)

Describes very satisfactory sewage farm, on which principal crop is walnuts.

Present condition of sewage disposal at Paris. 1,000 w. 1899. (In Engineering news, v.42, p.107.)

Outlines progress in applying sewage of Paris to irrigation farms.

Reflections on sewage farming suggested by experiences at Reading, England. 3,000 w. 1905. (In Engineering news, v.54, p.515.)

Editorial discussion of method of operation and cost of the Reading farm, and results from it.

Report on the experiments made in Paris on the application and purification of sewage. 2,300 w. 1869. (In Engineer, London, v.28, p.16.)

The same. (In Van Nostrand's eclectic engineering magazine, v.2, p.155.)

Richards, Ellen H. & **Moulton,** C. W.

Ten years' experience with broad irrigation at Vassar College. 1,600 w. 1 dr. 2 ill. 1906. (In Journal of the Association of Engineering Societies, v.36, p.148.)

Describes successful sewage farm.

Roechling, H. Alfred.

Sewage farms of Berlin. 20,000 w. 3 maps. 1892. (In Minutes of proceedings of the Institution of Civil Engineers, v.109, p.179.)

Discussion, 18,000 w.

The same, condensed. 2,000 w. (In Engineering record, v.26, p.157.)

Detailed description of operation and working of "the largest and most successful sewage-farms in the world."

Septic tank and broad irrigation for sewage disposal at the provincial jail, Victoria, B. C. 500 w. 3 dr. 1904. (In Engineering news, v.51, p.199.)

Sewage disposal at a leper asylum. 3,500 w. 2 dr. 1901. (In Engineer, London, v.92, p.371.)

Describes successful sewage farm at Bombay, India, with previous septic treatment.

Sewage farm of Achères, Paris. 3,500 w. 1898. (In Engineering news, v.39, p.170.)

Satisfactory results have been obtained on this immense farm.

Smith, Jonah Walker.

Sewerage and sewage disposal of Burton-upon-Trent. 4,300 w. 4 dr. 1899. (In Minutes of proceedings of the Institution of Civil Engineers, v.146, p.262.)

The same. (In Engineering record, v.45, p.81.)

Sewage particularly offensive from presence of brewery wastes. Treatment is by addition of lime and application to a sewage farm.

Tainturier, C.

Le tout à l'égout et l'assainissement de la Seine. 14,000 w. 18 dr. 4 ill. 1894. (In Le Génie civil, v.24, p.182, 196, 225.)

Reviews history of sewage question at Paris and shows advantages from adoption of broad irrigation system of disposal.

Target, Felix.

On the main drainage of Paris and the utilisation of its sewage. 13,000 w. 1878. (In Minutes of proceedings of the Institution of Civil Engineers, v.53, p.193.)

Includes description of sewage farms of Paris in 1878.

Till, W. S.

Sewage-farm at Saltley, England. 3,800 w. 1886. (In Sanitary record, v.14, p.444, 500.)

Paper before the British Association for the Advancement of Science.

Williams, Benezette.

Pullman sewerage. 4,500 w. 1 folding pl. 1882. (In Journal of the Association of Engineering Societies, v.1, p.311.)

The same. (In Scientific American supplement, v.14, p.5595.)

Information concerning irrigation farm at Pullman, Ill., the first of its kind in America.

Chemical Precipitation Only

General

A. B. C. process. 5,500 w. 1872–73. (In Engineering, v.14, p.394, 440; v.15, p.12.)

The same, condensed. 3,000 w. (In Van Nostrand's eclectic engineering magazine, v.8, p.156, 226.)

Process in which precipitant consists of a mixture of alum, blood, clay and charcoal. Precipitate to be used as fertilizer.

Adeney, W. E.

Recent advances in the bacterio-chemical study of sewage and other polluted waters. 8,000 w. 1896. (In Engineering, v.61, p.728, 762.)

Paper before the Institution of Civil Engineers of Ireland.

Discusses processes of fermentation and nitrification that take place in sewage, concluding that putrefaction can be prevented by supplying the polluted water with a sufficient amount of oxygen by the addition of nitrate of soda.

Adeney, W. E.

Recent advances in the bacterio-chemical study of sewage and polluted waters. 3,000 w. 1898. (In Engineering, v.66, p.277.)

Paper before the Institution of Civil Engineers of Ireland.

Treats of use of manganese precipitants that will prevent after-putrefaction in sewage sludge.

Allen, Kenneth.

Treatment of the effluent from sewage precipitation works. 3,400 w. 1897. (In Municipal engineering, v.13, p.125.)

Reviews methods in use in various towns in Great Britain, with information on materials used in constructing filter beds.

Barrow, J.

Purification of sewage by precipitation. 1,200 w. 1892. (In Journal of the Society of Chemical Industry, v.11, p.4.)

Describes experimental work on the action on sewage of a new precipitant, "clarine," consisting mainly of a basic ferric chlorid.

Chemical precipitation of sewage. 1,200 w. 1891. (In Engineering record, v.24, p.169.)

Information from report of Massachusetts state board of health on amount of precipitant to be added and the precipitant giving the best results.

Crimp, W. Santo.

Filter-presses for the treatment of sewage sludge. 5,000 w. 10 dr. 1887. (In Minutes of proceedings of the Institution of Civil Engineers, v.88, p.175.)

Discussion.

The same, condensed. 900 w. (In Engineer, London, v.63, p.158.)

Claims that filter press should be used in disposing of sludge and that resulting cakes are valuable as fertilizing material.

Croll, James.

Filter presses for sewage sludge. 5,500 w. 9 dr. 1897. (In Transactions of the Society of Engineers, v.37, p.121.)

Flagg, J. Foster.

English sewage treatment works. 3,200 w. 6 dr. 1892. (In Engineering record, v.25, p.76.)

Describes from personal observations operation of works at Coventry, Kingston, Hendon, Acton and London. Precipitation methods generally in use.

Godfrey, R.

"Amines process" of sewage treatment. 3,200 w. 1889. (In Transactions of the Sanitary Institute, v.10, p.203.)

Discussion, 3,200 w.

Consists in the addition of a precipitating and deodorizing agent, formed by mixture of herring brine with milk of lime. Author reports successful working.

Grossmann, J.

Treatment and disposal of town sewage. 3,000 w. 1898. (In Journal of the Society of Chemical Industry, v.17, p.421.)

Compares bacteriological and precipitation methods of treatment. Believes that cost can be greatly reduced by use of lime as precipitant.

Harris, John.

Chemical disposition of sewage. 1,500 w. 1884. (In Public health, v.10, p.267.)

Favors Hillé's method, using lime, magnesium chlorid and coal tar.

Hazen, Allen.

Chemical precipitation of sewage. 7,000 w. 1891. (In Journal of the Association of Engineering Societies, v.10, p.385.)

Gives results of experiments at the Lawrence (Mass.) Experiment Station, using lime, copperas, ferric salts and aluminium salts as precipitants.

Hutchinson, Christopher Clarke.

On the disposal of sewage sludge. 6,500 w. 2 diag. 3 dr. 1884. (In Journal of the Society of Chemical Industry, v.3, p.41.)

Regards as most efficient the use of filter presses, preceded by precipitation with sulphate of alumina and milk of lime.

Keith, W.

Phosphate Sewage Company's process. 700 w. 1876. (In Journal of the Society of Arts, v.24, p.631.)

Precipitants used are phosphates of alumina and lime.

Law, Herbert Henry.

Treatment of sewage by chemicals in perfect solution. 3,000 w. 1 dr. 1896. (In Journal of the Sanitary Institute, v.17, p.475.)

Discussion, p.495.

Considers adding of lime in form of mixture known as "cream of lime" unsatisfactory. By use of saturated solutions exact quantity of precipitant added could be known.

Learned, Wilbur F.

Some facts about the chemical treatment of Mystic sewage. 2,500 w. 1888. (In Journal of the Association of Engineering Societies, v.7, p.244.)

Sewage contained large amount of organic matter from tanneries. Crude sulphate of ammonia used as precipitant.

Moor, C. G.

On a new method of disposal of sewage, with some references to schemes now in use. 2,000 w. 1891. (In Scientific American supplement, v.32, p.13236.)

Abstract of paper before the British Association for the Advancement of Science.

Method consists in the distillation of the ammonia and its recovery from sewage sludge.

Munro, John M. H.

Composition and manurial value of filter-pressed sewage sludge. 6,500 w. 1885. (In Journal of the Society of Chemical Industry, v.4, p.12.)

Shows results obtained at Coventry, Leyton and West Ham, England.

Parry, W. Kaye.

Sewage purification without filtration. 1,600 w. 1899. (In Journal of the Sanitary Institute, v.20, p.632.)

Discussion, 1,100 w.

Argues in favor of Adeney's method and gives figures of cost.

Parry, W. Kaye.

True principles of sewage purification. 4,500 w. 1898. (In Journal of the Sanitary Institute, v.18, p.531.)

Discussion, p.576.

Gives details of investigations of Adeney for purifying sewage by addition of nitrate of soda to supply oxygen.

Parsons, H. de B.

Sewage disposal. 2,800 w. 1899. (In Stevens Institute indicator, v.16, p.21.)

Gives conditions for the natural purification of sewage and describes operations of chemical precipitation method.

Rawson, C.

A B C process for treating sewage, Native Guano Company. 2,000 w. 1876. (In Journal of the Society of Arts, v.24, p.634.)

Describes process claimed to be successful in treatment of sewage and in producing valuable fertilizer. Precipitant consists of mixture of alum, blood, clay and charcoal.

Raymond, J. H.

Treatment of sewage by chlorine, precipitation and sedimentation. 7,000 w. 6 dr. 1890. (In Public health, v.16, p.132.)

Process consists of adding successively milk of lime, ferric chlorid and chlorin. Gives attention to cost of treatment.

Robinson, Henry.

Sewage disposal. 6,000 w. 1879. (In Transactions of the Society of Engineers, v.19, p.197.)

Points to chemical precipitation by sulphate of alumina and lime as the most effective method, with subsequent land disposal.

Savage, Edward B.

Sewerage and sewage disposal of a small town. 78 p. n. d.

Reprint of articles from the "Contract journal."
Includes chapter on precipitation methods.

Scott, Henry Y. D.

On a new mode of dealing with sewage precipitates. 6,400 w. 1872. (In Journal of the Society of Arts, v.20, p.547.)

The same. (In Van Nostrand's eclectic engineering magazine, v.7, p.206.)

Advocates use of lime and clay as precipitant and the conversion of the slush into cement.

Sewage purification and the A B C process vindicated. 2,400 w. 1885. (In Quarterly journal of science, v.22, p.473.)

Opposes report by Royal Rivers Pollution Commission and cites report by Professors Dewar and Tidy.

Sewage sludges. 2,000 w. 1899. (In Engineering record, v.39, p.209.)

Reviews work of W. E. Adeney to prevent after-putrefaction of sludges by supplying sufficient oxygen by addition of manganese peroxid.

Solution of the sewage problem. 8,000 w. 1873. (In Quarterly journal of science, v.10, p.55.)

The same. (In Van Nostrand's eclectic engineering magazine, v.8, p.429.)

Reviews methods in use (1873) and favors A. B. C. process.

Watson, W. M.

Sewage disposal. 2,000 w. 5 dr. 1897. (In Canadian engineer, v.4, p.323.)

Reviews chemical methods of purifying sewage and concludes that none is thoroughly efficient by itself.

Whittbread's sewage process. 1,500 w. 1873. (In Engineering, v.16, p.33.)

The same. (In Van Nostrand's eclectic engineering magazine, v.9, p.315.)

Consists in use as precipitant of calcium phosphates and milk of lime. Precipitate to be of use as fertilizer.

Individual Plants

Alvord, John W.

Purification of sewage in England. 2,000 w. 1900. (In Municipal engineering, v.14, p.262.)

Paper before the Illinois Society of Engineers and Surveyors.

Describes method in use at Acton, England, where chemical precipitation by "ferozone" was followed.

Bacillite sewage disposal at Hanley, England. 800 w. 1899. (In Engineering record, v.39, p.385.)

Sewage is treated with lime and ferrous chlorid, and the effluent is treated with carbonic acid gas and carbolic steam and passed over a small plot of ground.

Barrow, E. G.

Sewage disposal by chemical precipitation at Hamilton, Ont. 900 w. 1 dr. 1897. (In Engineering news, v.37, p.62.)

Lime and sulphate of alumina are used as precipitants.

Bennett, William B. G.

Description of the Southampton sewage precipitation works and refuse destructor. 3,000 w. 7 pl. 1892. (In Proceedings of the Institution of Mechanical Engineers, v.43, p.354.)

The same, condensed. 2,400 w. (In Engineering news, v.28, p.198.)

Precipitant used was "ferrozone." Sewage sludge was at first incinerated but later used for fertilizing purposes.

Bennett, William B. G.

New sewerage and sewage disposal works of the borough of Southampton. 5,000 w. 1 map. 1900. (In Journal of the Sanitary Institute, v.21, p.97.)

Treatment consists of precipitation with aluminoferric.

Canton, O. sewerage system. 2,400 w. 8 dr. 1893. (In Engineering record, v.28, p.27.)

Description of works, with methods of adding chemicals.

Chapin, L. E.

Sewage disposal works, Canton, Ohio. 4,000 w. 3 dr. 3 ill. 1894. (In Journal of the Association of Engineering Societies, v.13, p.115.)

The same. (In Scientific American supplement, v.37, p.15349.)

Method of disposal is by precipitation with lime and alum. Resulting sludge is pressed in filter presses and utilized as fertilizer.

Chautauqua sewage disposal works. 1,400 w. 2 dr. 1894. (In Engineering record, v.30, p.58.)

Method consists of screening, precipitation with lime and alum, and the filter-pressing of the sludge.

Chemical sewage treatment, Brooklyn, N. Y. 800 w. 1 dr. 1899. (In Engineering record, v.39, p.378.)

Powers system in use for part of city. Lime, ferric chlorid and chlorin used as precipitants.

Chemical treatment of sewage at New Rochelle, N. Y. 700 w. 1898. (In Engineering record, v.37, p.453.)

Crimp, W. Santo.

Wimbledon [England] main drainage and sewage disposal works. 6,000 w. 1888. (In Transactions of the Society of Engineers, v.28, p.73.)

Discussion, 8,000 w.

Method of disposal consists of precipitation with lime and aluminoferric, and application of effluent to irrigation.

East Molesey drainage and sewage disposal works. 2,000 w. 7 dr. 1895. (In Engineering, v.60, p.763.)

Briefly describes arrangement of disposal plant for chemical precipitation, with provision for filtration, if found desirable.

Eddy, Harrison P.

Sewage disposal at Worcester, Mass. 2,200 w. 1894. (In Journal of the American Chemical Society, v.16, p.682.)

Outlines facts leading up to adoption and operation of chemical precipitation plant. Gives table showing degree of purification.

Fuertes, James H.

London sewage disposal. 1,600 w. 1898. (In Engineering record, v.38, p.275.)

Treatment consists in chemical precipitation at two stations separately by lime and ferrous sulphate. Resulting sludge disposed of at sea.

Fuertes, James H.

Sewage disposal at Chichester, England. 900 w. 6 dr. 1900. (In Engineering record, v.41, p.129.)

Chemical precipitation by lime and sulphate of alumina, followed by land disposal of the effluent.

Fuertes, James H.

Sewage disposal at Friern Barnet, England. 1,700 w. 3 dr. 1898. (In Engineering record, v.38, p.429.)

Description of plant presenting many interesting features, precipitating the suspended matter by addition of lime and aluminoferric cakes. Precipitation is followed by intermittent filtration of the effluent.

Fuertes, James H.

Sewage disposal at Lincoln, England. 1,100 w. 1 dr. 1899. (In Engineering record, v.40, p.699.)

Sewage treated with "ferozone," passed through polarite filters and the effluent applied to irrigation purposes.

Fuertes, James H.

Sewage disposal at Manchester, England. 1,400 w. 2 dr. 1899. (In Engineering record, v.40, p.626.)

Describes plant at which sewage is treated with lime and ferrous sulphate. Report of commission of experts is given, in abstract, recommending use of two sets of contact beds, after preliminary sedimentation.

Fuertes, James H.

Sewage disposal at Newport, Isle of Wight. 700 w. 7 dr. 1898. (In Engineering record, v.37, p.429.)

Method of disposal is by precipitation with lime and ferrous sulphate or aluminoferric cakes.

Fuertes, James H.

Sewage disposal, Kingston-on-the-Thames, England. 1,100 w. 9 dr. 1899. (In Engineering record, v.39, p.424.)

Modification of A. B. C. process, using charcoal, clay and alum as precipitating mixture.

Fuertes, James H.

Sewage treatment at Acton, England. 600 w. 2 dr. 1900. (In Engineering record, v.41, p.418.)

Chemical precipitation with "ferozone" and filtration through polarite.

Fuertes, James H.

Sewerage of Ealing, England. 700 w. 2 dr. 1900. (In Engineering record, v.41, p.370.)

Precipitation by lime, clay and sulphate of alumina. Sludge mixed with house refuse and burned in destructors.

Gerhard, William Paul.

Sewage purification at Frankfort-on-Main. 4,500 w. 3 dr. 1885. (In Engineering news, v.14, p.114.)

Abstract translation of report of the chief engineer.

Proposal to adopt use of sedimentation basins and chemical precipitation by sulphate of alumina.

Hamilton [Ont.] sewage disposal works. 1,500 w. 8 dr. 1897. (In Canadian engineer, v.4, p.252.)

Describes arrangement of precipitation plant.

Kinnicutt, Leonard Parker, & **Eddy,** H. P.

Purification of the sewage of Worcester, Mass. by chemical precipitation. 2,000 w. 1 dr. 1891. (In Journal of analytical and applied chemistry, v.5, p.544.)

Landreth, William B.

Chautauqua, N. Y. sewage disposal works. 3,000 w. 2 dr. 2 ill. 1894. (In Transactions of the American Society of Civil Engineers, v.32, p.1.)

Chemical precipitation works, using lime and alum. Gives costs of operation and materials, and physical and chemical results.

Melliss, C. J.

Treatment of sewage according to the processes of the General Sewage and Manure Company, Limited, at Coventry, Nuneaton and Kenilworth, in the county of Warwick. 2,000 w. 1876. (In Journal of the Society of Arts, v.24, p.628.)

Sewage is strained mechanically, treated with sulphate of alumina and lime and the effluent passed onto filter beds. Sludge is pressed and partially dried by heating.

Parsons, H. de B.

Sewage precipitation works of New Rochelle, N. Y. 1,200 w. 5 dr. 1 ill. 1899. (In Stevens Institute indicator, v.16, p.138.)

Precipitation works at the Barking sewage outfall. 3,100 w. 10 dr. 1887. (In Engineer, London, v.63, p.83, 109.)

Illustrated description of extensive works for purifying London sewage by precipitation with lime and a sulphate of iron.

Richardson, F. W.

Bradford sewage and its treatment. 4,200 w. 1900. (In Engineering record, v.42, p.544.)

Paper before the British Association for the Advancement of Science.

Sewage is very complex owing to great amount of liquor from woolen mills. Experiments are being tried (1900) in treating the wool-suds before entrance into sewers. Experimental treatment of the main sewage has been tried with various precipitants. Best results were obtained with basic ferric sulphate.

Richou, G.

Épuration des eaux d'égout; combinaison d'un procédé chimique et de la méthode biologique à Wenduyne (Belgique); procédé chimique Bayer employé à Brünn. 2,500 w. 1902. (In Le Génie civil, v.41, p.317.)

Describes process at Wenduyne, Belgium, where sewage is treated with the double sulphate of iron and aluminium and with lime, and the Bayer process used at Brünn, Austria.

Sewage at Aylesbury. 800 w. 1885. (In Builder, v.48, p.857.)

The same. (In Engineering news, v.14, p.49.)

Describes series of experiments by Professors Dewar and Tidy showing A. B. C. process to be effective.

Sewage disposal at Alliance, Ohio. 1,800 w. 1900. (In Engineering record, v.41, p.31.)

Description of precipitation plant, analyses of sewage and effluent, and cost of maintenance.

Sewage disposal at Hebden Bridge [England]. 1,500 w. 8 dr. 1903. (In Engineer, London, v.96, p.397.)

Describes installations for chemical treatment and filtration of sewage.

Sewage disposal at Worcester, Mass. 3,400 w. 8 dr. 1891. (In Engineering record, v.23, p.258.)

Sewage disposal at Worcester, Mass. 3,500 w. 1 diag. 12 dr. 1894. (In Engineering record, v.29, p.107.)

Composition of sewage is unusual owing to regular discharge into sewers of quantities of sulphuric and muriatic acids. This is utilized to replace some of the sulphate of alumina as precipitant. Plant has been (1894) in successful operation for several years.

Sewage disposal at Worcester [Mass.]. 2,000 w. 5 ill. 1908. (In Municipal journal and engineer, v.24, p.93.)

Part of the sewage is treated chemically and part on sand filters.

Sewage disposal system of Worcester, Massachusetts. 7,000 w. 8 dr. 2 ill. 1891. (In Manufacturer and builder, v.23, p.84.)

Sewage disposal works at Worcester, Mass. 4,200 w. 8 dr. 1890. (In Engineering news, v.24, p.432.)

Describes details of operation of a plant at which the sewage is purified by chemical precipitation. From information contained in report by city engineer, Charles A. Allen.

Sewage precipitation works at Providence. 3,000 w. 5 dr. 1901. (In Engineering record, v.43, p.416.)

Describes plant, first used in 1901, for precipitation with lime.

Sewerage of Providence, R. I. 5,500 w. 1887. (In Sanitary engineer, v.15, p.134.)

Abstract of report by committee to examine and report on plans submitted. Recommendations were for chemical precipitation.

Tatham, George.

Leeds sewage treatment. 2,000 w. 1876. (In Journal of the Society of Arts, v.24, p.632.)

Reviews methods of treating sewage, mainly by chemical methods, as proposed for Leeds.

Unsuccessful sewage purification plant at Madison, Wis. 3,300 w. 2 diag. 1900. (In Engineering news, v.44, p.253.)

Review of report by F. E. Turneaure. Discusses results obtained at the plant, using chemical precipitation, and gives suggestions as to course to be followed by the city in accepting or remodeling the plant.

Watson, W. M.

Report on the precipitation system of sewage disposal in operation at Hamilton, Ont. 2,500 w. 1898. (In Canadian engineer, v.6, p.39.)

Questions advisability of using lime as precipitant and considers manganese salts or oxids or chlorids of iron. Considers precipitation methods very expensive.

Wollheim, Albert.

Foreign sewage precipitation works. 6,000 w. 1892. (In Transactions of the Society of Engineers, v.32, p.123.)

Discussion.

Briefly describes German works at Frankfort a. M. and at Dortmund, and American works at Worcester, Mass.

Worcester sludge process. 1,400 w. 2 dr. 2 ill. 1900. (In Engineering record, v.41, p.370.)

Description of filter presses and process for pressing sludge at Worcester, Mass.

Disinfection, including Electrolytic Methods

Application of electricity to the sewage problems. 1,000 w. 1895. (In Electricity, New York, v.9, p.254.)

Abstract of paper by John W. Langley before the Cleveland Council of Sociology. Salt water is pumped through tanks and electrolyzed. Chlorin generated acts as disinfectant.

Daniels, F. E.

Disinfection of sewage with chloride of lime. 2,500 w. 2 dr. 1909. (In Journal of the Engineers' Society of Pennsylvania, v.1, p.391.)

Describes work carried on at Red Bank, N. J.

Digby, W. Pollard, & **Shenton,** H. C. H.

Prevention of the bacterial contamination of streams and oyster beds. 10,000 w. 16 dr. 1906. (In Transactions of the Society of Engineers, v.46, p.229.)

Discussion, 18 p.

Concerned especially with sterilization of sewage effluents by chlorin, with development of different processes proposed and cost of application.

Disinfection of water and sewage. 1,800 w. 1910. (In Municipal journal and engineer, v.28, p.173.)

Gives information from paper by Potts before the New Jersey Sanitary Association. Brief review of knowledge to date on the subject.

Disinfection of water and sewage filter effluents. 3,000 w. 1910. (In Engineering record, v.61, p.80.)

Reviews paper by Phelps before the Boston Society of Civil Engineers.

Electrical purification of sewage. 1,800 w. 1891. (In Engineering record, v.23, p.114.)

Abstract of paper by Frank M. Gilley before the Society of Arts, Boston. Describes experiments of Webster at Crossness, a suburb of London.

Electrical treatment of sewage. 1,600 w. 4 dr. 1889. (In Engineer, London, v.67, p.261.)

The same, condensed. (In Engineering news, v.21, p.338.)

Describes experiments of Webster at Crossness, where he successfully treated an equivalent of 12,000 gallons of sewage per hour.

Hedenberg, W. L.

Future methods of sewage purification. 4,000 w. 1895. (In Engineering magazine, v.10, p.76.)

Believes that purification by electricity has much promise. Describes Hermite and Woolf systems and compares their cost with that of other methods.

Kellerman, Karl F. *and others.*

Disinfection of sewage effluents for the protection of public water supplies. 47 p. 1907. (In United States—Bureau of plant industry. Bulletin no.115.)

The same, condensed. 4,500 w. (In Engineering record, v.56, p.547.)

Describes detailed experiments on efficiency and cost of disinfection of sewage effluents by copper sulphate and by chlorin.

Napier, J.

Hermite process of deodorizing sewage at Ipswich. 1,600 w. 1895. (In Scientific American supplement, v.40, p.16565.)

Paper before the British Association for the Advancement of Science.

Electrical process of purification. Sea water or a solution of chlorids is electrolyzed, with formation of hypochlorite. This is added to the sewage at entrance to sewer.

Newcomb, Edwin L.

Copper sulphate as an adjunct to sewage disposal. 1,100 w. 1905. (In Journal of the New England Water Works Association, v.19, p.573.)

Experiments on disinfection of the effluent from septic tanks and filter beds.

Parfitt, Walter E.

Sewage purification for the city of New York. 6,000 w. 9 dr. 1 folding map. 1907. (In Proceedings of the Brooklyn Engineers' Club, v.11, p.65.)

Discussion, 2,000 w.

Proposal to introduce into sewage hypochlorous acid gas under pressure, to sterilize harmful germs and odors, oxidize polluting matter and precipitate solid organic matter. Sludge to be mixed with a marl and sold as fertilizer.

Phelps, Earle B.

Disinfection of sewage and sewage effluents. 2,500 w. 1909. (In Municipal engineering, v.37, p.365.)

The same. (In Municipal journal and engineer, v.27, p.924.)

Paper before the American Society of Municipal Improvements.

Discusses conditions under which a disinfection method of treating the sewage is advisable and considers cost.

Phelps, Earle B.

Disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents. 25,000 w. 2 dr.

Phelps, Earle B.—*continued.*

1909. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.5.)

The same. (In United States—Geological survey. Water-supply and irrigation papers, no.229.)

The same, condensed. 8,000 w. (In Canadian engineer, v.18, p.148, 174, 222.)

The same, condensed. (In Engineering-contracting, v.32, p.125.)

The same, condensed. (In Engineering record, v.59, p.688.)

Very valuable record of investigations concerning the agents available for disinfection and its cost. Describes practical experiments carried out at Boston, Red Bank, N. J. and Baltimore. Concludes with a study of putrefaction. Full references to original sources.

Phelps, Earle B.

Disinfection of water and sewage. 5,000 w. 1910. (In Proceedings of the Engineers' Club of Philadelphia, v.27, p.135.)

Discussion, 2,400 w.

The same. (In Canadian engineer, v.18, p.640.)

The same, condensed. 1,500 w. (In Engineering record, v.61, p.646.)

"References," p.146.

Discusses conditions under which disinfection is advisable, with consideration of cost when using chlorid of lime as disinfectant.

Phelps, Earle B.

Sterilization of sewage filter effluents. 600 w. 1907. (In Science, v.48, p.808.)

Abstract of paper before the Society of American Bacteriologists.

Effluent from trickling filter was treated with bleaching powder and with copper sulphate, better results being obtained with the former.

Phelps, Earle B. & **Carpenter,** W. T.

Sterilization of sewage-filter effluents. 8,000 w. 1906. (In Technology quarterly, v.19, p.382.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.4.)

The same, condensed. 1,000 w. (In Municipal journal and engineer, v.22, p.444.)

Gives data on efficiency and cost of sterilization by various proposed agents.

Professor Roscoe's reports on the deodorisation of the London sewage. 6,000 w. 1888. (In Builder, v.55, p.26.)

The same. (In Engineering and building record, v.18, p.161, 173.)

Report by Sir Henry Roscoe to the Metropolitan Board of Works. Considers general value of deodorization, and the disinfectant to be used.

Rideal, Samuel.

Application of electrolytic chlorine to sewage purification and deodorisation by the "oxychlorides" process. 8,000 w. 6 diag. 1 ill. 1909. (In Transactions of the Faraday Society, v.4, p.179.)

The same, condensed. 2,000 w. (In Engineering, v.87, p.222.)

Rideal, Samuel.

On the sterilization of effluents, with special reference to oysters and other shell-fish and to water-cress beds. 13,000 w. 1905. (In Journal of the Royal Sanitary Institute, v.26, p.378.)

Bibliography, p.406.

Considers the different sterilizing agents that may be used and discusses efficiency of sterilization of effluents from septic tanks and from contact beds.

Roscoe, *Sir* Henry E. & **Lunt,** Joseph.

"Hermite" process of sewage treatment. 8,000 w. 2 diag. 2 dr. 1895. (In Journal of the Society of Chemical Industry, v.14, p.224.)

Record of experiments and results from a week's test at Worthing. Shows the process to be effective for deodorizing but inapplicable for purification of sewage.

Shenton, Henry C. H.

Disinfection of sewage and sewage filter effluents. 1,200 w. 1910. (In Canadian engineer, v.18, p.380.)

Takes exception to some conclusions of Phelps.

Shenton, Henry C. H.

Practical sterilisation of water and of sewage effluents. 8,000 w. 1909. (In Canadian engineer, v.16, p.707, 735, 759.)

Paper before the Institute of Municipal Engineers.

Considers sterilization of sewage practicable and, at times, advisable, and takes up use of ozone, hypochlorite, hermite, oxychlorids, copper sulphate and other agents.

Webster, William.

Electrical purification of sewage and contaminated water. 2,500 w. 1891. (In Scientific American supplement, v.31, p.12772.)

Paper before the Chemical Society, London.

Webster, William.

Purification of sewage and contaminated water by electrolysis. 2,600 w. 3 dr. 1889. (In Engineering news, v.22, p.387.)

Condensed from paper before the British Association for the Advancement of Science.

Gives details of operation, costs, and degree of purification attained.

Webster, William.

Purification of sewage and contamination of water. 2,500 w. 1890. (In Journal of the Society of Chemical Industry, v.9, p.1093.)

Discussion, 7,500 w.

Describes author's process for electrolytic treatment of sewage, using iron electrodes.

Woolf electrolytic disinfectant. 1,500 w. 2 ill. 1893. (In Electrical engineer, N. Y., v.16, p.53.)

Describes operation of purification plant at Brewsters, N. Y., where salt water is electrolyzed and made to flow into the sewers. The hypochlorites, etc. formed by the electrolysis act as disinfectants.

Filtration, with or without Preliminary Treatment

Through Contact Beds

General

Alvord, John W.

On the use of coke breeze in sewage purification. 6,000 w. 1898. (In Journal of the Western Society of Engineers, v.3, p.1041.)

Reviews use of coarse-grained coke filters or bacteria tanks in England and suggests a comparison between their cost and efficiency and that of the Chicago drainage canal.

Archibald, Douglas.

Effective solution of sewage treatment and disposal by chemical tank and bacterial filter. 5,500 w. 1901. (In Journal of the Sanitary Institute, v.22, p.124.)

Argues for preliminary chemical treatment.

Bacterial sewage disposal in England. 2,000 w. 1901. (In Engineering record, v.44, p.130.)

Review of report by C. H. Rust, city engineer of Toronto.
Investigation of purification by use of septic tank and bacteria beds.

Biolysis of sewage. 1,600 w. 1898. (In Engineering record, v.38, p.561.)

Review of paper by W. D. Scott-Moncrieff. Record of results from treatment of sewage, for the cultivation of bacteria best suited for successive steps of purification.

Burford, S. F. & **Smith,** T. R.

Filtration of sewage through coke breeze. 3,300 w. 1897. (In Journal of the Society of Chemical Industry, v.16, p.25.)

Record at the Kettering, England, disposal works. Consists chiefly of tables showing degree of purification obtained.

Clark, H. W.

Non-nitrification of septic sewage in contact filters. 1,000 w. 1901. (In Public health, v.27, p.464.)

Clark, H. W.

Stability of sewage effluents from coarse filters. 2,800 w. 1902. (In Engineering record, v.48, p.445.)

Abstracted from part of report of Massachusetts state board of health, 1901.
Discussion of condition and tests mainly of effluents from contact filters.

Crane, Albert S.

Filtration of sewage. 2,300 w. 2 ill. 1898. (In Proceedings of the Brooklyn Engineers' Club, v.2, p.45.)

Discussion, 4,000 w.
Describes bacteria beds and septic tanks as used in England.

Dibdin, William J.

Filtration of sewage effluent. 6,000 w. 1895. (In Journal of the Society of Chemical Industry, v.14, p.915.)

Discussion, 4,000 w.
Record of experiments on efficiency and methods of operation of sewage filters. Best results were obtained by using filters constructed of coke breeze.

Dibdin, William J.

Recent improvements in the biological treatment of sewage. 5,000 w. 1906. (In Journal of the Society of Chemical Industry, v.25, pt.1, p.414.)

Gives results of use of slate beds in treatment of sewage for the better removal of sludge.

Dibdin, William J. & **Thudichum,** George.

Bacterial treatment of sewage containing manufacturing refuse. 2,300 w. 1898. (In Journal of the Society of Chemical Industry, v.17, p.315.)

Discussion, 1,600 w.

Dibdin, William J. & **Thudichum,** George.

Present problems in the bacterial treatment of sewage. 3,000 w. 1899. (In Journal of the Sanitary Institute, v.20, p.639.)

The same, condensed. 2,300 w. (In Engineering record, v.40, p.476.)

Report on water capacity of bacterial beds, size of filtering material and influence on organic nitrogen.

Electricity in the Hanley sewage works. 2,200 w. 1 dr. 3 ill. 1907. (In Electrical engineer, London, v.45, p.858.)

Describes especially the power-driven distributors for the bacteria beds.

Filtration of sewage through coal. 2,400 w. 1898. (In Municipal engineering, v.14, p.29.)

Abstract of paper by A. Bostock Hill before the British Association of Municipal and County Engineers, showing the very favorable results obtained at Lichfield and Wolverhampton, England.

Fowler, Gilbert J.

Management of septic tanks and bacterial contact beds. 2,800 w. 1901. (In Engineering news, v.46, p.193.)

From paper before the Royal Institute of Public Health.

German experiments with sewage treatment by septic tanks and contact filter beds. 900 w. 1902. (In Engineering news, v.47, p.291.)

From the "Surveyor," London.

Abstract of pamphlet by Dunbar and Thumm, giving results of valuable experiments.

Hill, A. Bostock.

Filtration of sewage through coal. 2,400 w. 1898. (In Journal of the Sanitary Institute, v.18, p.554.)

Discussion, p.576.

The same, condensed. 1,800 w. (In Engineering record, v.41, p.101.)

Results and analyses obtained at Lichfield and Wolverhampton, England.

Hill, A. Bostock, & **Garfield,** Joseph.

Some further experiments and results in bacteriological treatment of sewage, with especial reference to filtration through coal. 3,000 w. 1899. (In Journal of the Royal Sanitary Institute, v.20, p.644.)

Discusses results of experiments at Lichfield and Wolverhampton, England.

Hughes, T.

Treatment of crude sewage in triple contact-beds. 5,400 w. 1905. (In Municipal engineering, v.29, p.109.)

From paper before the British Association of Managers of Sewage Disposal Works.

Results of six years experiments are given. Conclusion is that methods relying on liquefaction of the solids of sewage will fail in that the organic matter of a colloidal nature, which cannot be removed by precipitation, is an important obstacle that must be considered.

Johnson, John Butler.

Recently improved methods of sewage disposal. 5,500 w. 1900. (In University of Wisconsin. Bulletin, engineering series, v.2, p.209.)

Describes carefully combination of septic tank with contact beds in sewage disposal plants.

Massachusetts—State board of health.

Study of the stability of the effluents of sewage filters of coarse materials, including investigations upon putrefaction and secondary decomposition. 22 p. 1901. (In its Annual report (33d), 1901, p.371.)

Modern methods of sewage purification. 2,200 w. 6 ill. 1901. (In Municipal engineering, v.20, p.257.)

Mainly devoted to conclusions of commission in charge of experiments at Manchester, England, favoring adoption of bacterial purification in contact beds.

Moncrieff, W. D. Scott-.

Bacterial treatment of sewage, with special reference to the biolysis of organic nitrogen. 5,500 w. 9 diag. 5 dr. 1907. (In Journal of the Royal Sanitary Institute, v.28, p.117.)

The same, condensed. 1,200 w. (In Engineer, London, v.103, p.244.)

Considers successive steps in bacterial purification of sewage, especially the nitrifying changes.

Moncrieff, W. D. Scott-.

Biolysis of sewage. 4,000 w. 1899. (In Journal of the Sanitary Institute, v.19, p.700.)

Discussion, p.717.

Brings organic matter into solution by means of cultivation tanks. Effluent from tank contains organic matter in unstable condition, favorable to rapid purification.

Moncrieff, W. D. Scott-.

Some recent experiments on the biolysis of sewage. 2,300 w. 1908. (In Journal of the Royal Sanitary Institute, v.29, p.426.)

Experiments on purification of sewage in cultivation tanks and filters under varying conditions.

New automatic regulators for septic tanks and contact beds. 2,300 w. 6 dr. 1902. (In Engineering record, v.46, p.438.)

Describes two patented devices, one for charging or discharging tanks, the other for discharging liquid from a septic tank into a series of contact beds in regular order.

New form of primary contact bed. 1,800 w. 1906. (In Engineering record, v.54, p.151.)

Beds are constructed of waste slate sheets, separated by about two inches by slate blocks.

Owens, R. B.

Description of aërobic biological purification of sewerage by means of the live earth bed system. 1,600 w. 4 dr. 1910. (In Canadian engineer, v.19, p.259.)

Claims efficient purification by means of contact of sewage with thin layers of "live earth," resting on thin concrete plates.

Phelps, Earle B.

Work at the Madeleine sewage experiment station, Pasteur Institute of Lille, France. 1,300 w. 1907. (In Engineering news, v.58, p.162.)

Information from two French reports, giving results of experiments on rate of operation and efficiency of septic tanks and contact beds.

Pickering, J. S.

Design of works for bacterial treatment of sewage. 4,500 w. 1907. (In Journal of the Royal Sanitary Institute, v.27, p.646.)

The same, condensed. 2,500 w. (In Builder, v.91, p.276.)

Information on design of preliminary and septic tanks and contact and percolation beds, including detailed statistics of construction from 40 bacterial treatment works.

Province of Alberta and sewage disposal. 2,000 w. 1910. (In Canadian engineer, v.19, p.257.)

Comment on a so-called "live earth bed system," similar to Dibdin's slate bed system, except that thin concrete slabs are used instead of slate. Shows claims of system to be extravagant.

Reid, George.

Sewage disposal by artificial filtration. 2,500 w. 1897. (In Builder, v.73, p.7.)

Abstract of paper before the Association of Municipal and County Engineers.
Shows favorable results obtained by use of Garfield coal filters.

Rideal, Samuel.

Purification of sewage by bacteria. 8,000 w. 4 folding pl. 1896. (In Journal of the Sanitary Institute, v.18, p.59.)

Discussion.
Consideration of chemical and bacteriological action taking place in septic tanks and contact beds.

Scott-Moncrieff system of sewage disposal. 3 dr. 1 ill. 1900. (In Engineer, London, v.89, p.90.)

Traces development of process and successive experiments of Scott-Moncrieff with his cultivation tank.

Shenton, Henry C. H.

Recent practice in sewage disposal. 9,000 w. 2 folding pl. 1900. (In Transactions of the Society of Engineers, v.40, p.217.)

Discussion, 9,000 w.
Gives much practical information concerning the arrangement, operation and efficiency of contact beds and septic tanks.

Small sewage disposal plants. 1,600 w. 7 dr. 4 ill. 1904. (In Engineer, London, v.98, p.133.)

Describes small plants using contact beds and sprinklers or special distributing apparatus.

Thresh, John C. & **Priest,** Martin.

On the distribution of sewage on bacteria beds. 2,000 w. 1903. (In Engineering, v.76, p.267.)

The same, condensed. (In Engineer, London, v.96, p.102.)

Paper before the Institute of Sanitary Engineers.
Shows that greatly increased efficiency results where distribution by sprinklers is followed.

Thudichum, George.

Bacterial purification of sewage. 4,000 w. 1903. (In Transactions of the Society of Engineers, v.43, p.185.)

Discusses briefly the course of bacterial action and shows the steps in the development of bacterial methods of purification.

Thudichum, George.

Bacterial sewage disposal during the past year. 2,000 w. 1900. (In Engineering record, v.42, p.124.)

Paper before the Association of Municipal and County Engineers.
Discussion, 4,000 w.

Thudichum, George.

Bacterial treatment of sewage. 5,000 w. 1898. (In Transactions of the Society of Engineers, v.38, p.207.)

Discussion, 6,000 w.

The same, condensed. 3,300 w. (In Engineering record, v.39, p.97.)

Shows conditions governing the use of bacteria beds and septic tanks as illustrated at Sutton and Exeter, England, respectively.

Thudichum, George.

Ultimate purification of sewage. 5,500 w. 1896. (In Transactions of the Society of Engineers, v.36, p.199.)

Discussion, 15,000 w.

Considers some of the more important features of biological purification, especially in filters of coke breeze, and compares this method with irrigation methods.

Use of coke in the treatment of sewage. 5,000 w. 1899. (In Journal of gas lighting, v.74, p.998.)

Review of report by Frank Clowes and A. C. Houston to the London County Council, giving details of construction of coke beds, degree of purification attained, and method of operation.

Van Buskirk, W. F.

Filtration of sewage. 1,800 w. 1898. (In Public health, v.24, p.60.)

Gives brief notice of work of the Lawrence (Mass.) Experiment Station and work for the London County Council.

Watson, W. M.

Sewage disposal through the action of bacteria. 2,300 w. 1898. (In Canadian engineer, v.5, p.344.)

Considerable information on construction and operation of sewage filters.

Wickenden, A. F.

Sewage disposal of isolated buildings. 1,400 w. 1910. (In National contractor and builder, v.2, p.15.)

From "Building world."

Describes small installation, consisting of a septic tank and three contact filters, to serve a population of about 240 persons.

Individual Plants

Archibald, Douglas.

Life-history for eight years of the experimental coke and clinker filter-beds at Kingston-on-Thames. 4,500 w. 1906. (In Journal of the Royal Sanitary Institute, v.27, p.473.)

The same, condensed. 3,000 w. (In Engineering record, v.54, p.323.)

Records experimental work valuable for unusual preliminary treatment of sewage used and for continuous record of satisfactory disposal.

Bacterial sewage disposal at East Cleveland. 1,600 w. 3 ill. 1900. (In Engineering record, v.41, p.128.)

Sewage is passed through two sets of bacteria beds, where the oxidation of organic impurities is hastened by the entrance of air under pressure.

Bacterial sewage treatment, Oswestry, England. 1,000 w. 1900. (In Engineering record, v.41, p.226.)

Describes system using primary and secondary contact beds. Analyses of raw sewage and of final effluent are given.

Bacterial treatment of crude sewage. 2,200 w. 1899. (In Engineering, v.68, p.462.)

Editorial description of experiments with London sewage, using contact beds of coke.

Bacterial treatment of crude sewage at Crossness [London]. 4,800 w. 4 diag. 1899. (In Engineer, London, v.88, p.389.)

Review of second report to the London County Council by Clowes and Houston. Records results of experiments on filtration of sewage through coke beds, showing solution of solid organic matter in high degree and a fair degree of purity in the effluent.

Bacteriological sewage works at Hampton-on-Thames [England]. 1,200 w. 6 dr. 2 ill. 1899. (In Engineer, London, v.88, p.404.)
Describes one of the earliest systems using contact beds.

Beddoes, Cecil C. E.
Sewage purification plant at Charlotte, N. C. 1,800 w. 3 diag. 1 dr. 2 ill. 1905. (In Engineering record, v.51, p.711.)
Successful plant consisting of open septic tanks with single contact beds.

Corbett, J.
Some sewage purification experiments. 3,300 w. 1902. (In Journal of the Sanitary Institute, v.23, p.601.)
Discussion.
The same, slightly condensed. (In Engineering, v.74, p.865.)
Records carefully the different experiments tried at Salford, England. Works are to include tanks for chemical precipitation, roughing filters and bacteria beds.

Fowler, Gilbert J.
Recent experience in the treatment of Manchester sewage. 6,000 w. 1904. (In Journal of the Royal Sanitary Institute, v.25, p.620.)
Discusses results obtained from open septic tanks and contact beds, and gives table of comparative data on sewage disposal at Manchester and other cities with similar conditions.

Fowler, Gilbert J.
Résumé of the Manchester experiments on sewage. 4,000 w. 1902. (In Journal of the Sanitary Institute, v.23, p.584.)
Discussion, p. 609.
The same, slightly condensed. (In Engineering, v.74, p.491, 552.)
Describes experiments and states conclusions, especially on the operation and efficiency of contact beds, with preliminary septic tank treatment.

Fowler, Gilbert J.
Sewage experiments at Matunga, Bombay. 1,800 w. 6 ill. 1907. (In Engineering news, v.58, p.146.)
Describes successful plant at a leper colony, consisting of septic tanks and contact beds.

Gavett, Andrew J.
Septic tanks and contact beds at Plainfield, N. J. 1,700 w. 10 dr. 1 ill. 1901. (In Engineering record, v.44, p.471.)

Hanley sewage works. 1,500 w. 1907. (In Engineer, London, v.103, p.550.)
History and description of works, consisting of detritus and septic tanks and bacteria beds.

Hart, George A.
Description of the sewerage and sewage disposal works of Leeds, with special reference to the sewage disposal works and lands at Rodley. 2,000 w. 2 dr. 1908. (In Journal of the Royal Sanitary Institute, v.29, p.15.)
Works consist of detritus and septic tanks and bacteria beds.

Hatton, T. Chalkley.
Sewage disposal plant for a large hotel at Bedford, Pa. 1,500 w. 3 dr. 1908. (In Engineering record, v.57, p.376.)
Plant consists of liquefying tank, two primary contact beds and a sludge bed. A high standard effluent was not necessary.

Hill, G. Everett.

Sewage disposal at Collingswood, N. J. 2,200 w. 6 dr. 1 ill. 1902. (In Engineering record, v.45, p.415.)

Plant consists of septic tank, coke contact beds as primary filters and coke wave beds as secondary filters.

Hill, G. Everett.

Sewage purification works at Depew, N. Y. 1,500 w. 2 dr. 2 ill. 1902. (In Engineering news, v.47, p.514.)

Plant consists of a septic tank, coke primary filters or contact beds and secondary filter beds of broken stone, operated on the wave bed plan.

Kinnicutt, Leonard Parker.

English experiments on the bacterial treatment of sewage, with an account of the work done at Manchester, England, during the past year. 13,000 w. 5 dr. 1900. (In Journal of the Association of Engineering Societies, v.24, p.107.)

Describes successful working of filtration plant combining septic tank with double contact beds.

Manchester [England] sewage. 3,000 w. 1899. (In Engineer, London, v.88, p.511.)

Editorial outline of report by experts to the city council, describing careful experiments with different disposal methods and recommending use of double contact beds.

Manchester [England] sewage. 3,000 w. 1899. (In Engineering, v.68, p.695.)

Reviews experiments with septic tanks combined with Roscoe filters or contact beds.

Manchester [England] sewage disposal experiments. 7,500 w. 3 dr. 1900. (In Engineering record, v.41, p.594, 613.)

Record of experiments by a special committee on the efficiency of septic tanks, bacteria beds and Roscoe filters. Committee recommended use of open septic tanks, followed by filtration through contact filters.

Mawbey, E. George.

Purification of Leicester sewage by sedimentation tanks, single contact beds and broad irrigation on clay land. 6,500 w. 1 dr. 5 ill. 1910. (In Journal of the Royal Sanitary Institute, v.31, p.177.)

The same, slightly condensed. 5,000 w. (In Engineering record, v.61, p.723.)

Mosman septic tanks, Sydney, N. S. W. 1,000 w. 1905. (In Engineering record, v.51, p.468.)

Plant consists of four septic tanks and eight contact filters.

New British sewage disposal works. 1,500 w. 1910. (In Municipal engineering, v.38, p.177.)

Gives extent of new works of Sheffield, consisting of settling tanks and contact beds.

New sewage disposal works, Sheffield, England. 3,600 w. 1910. (In Engineering record, v.61, p.15.)

New works consist of settling tanks, sludge wells and contact beds.

New trunk sewers and sewage disposal works for the city of Regina, Sask. 6,500 w. 1 dr. 1908. (In Canadian engineer, v.15, p.100.)

Reviews possible disposal methods and recommends establishment of experimental plant with septic tanks and contact beds.

Operations of the sewage works of Manchester, England, 1904–5. 1,700 w. 1905. (In Engineering news, v.54, p.472.)

Gives analyses of sewage treated in septic tanks and contact beds, with amounts of sludge removed and methods of removal.

Pierson, George H.

Sewage purification and refuse incineration plant, Marion, Ohio. 4,500 w. 8 dr. 4 ill. 1906. (In Engineering record, v.53, p.358.)

Describes septic tanks, contact beds, intermittent sand filters and incinerator for sewage sludge.

Pierson, George S.

Electric sewage pumps, septic tanks and contact beds at Fond du Lac, Wis. 3,000 w. 11 dr. 2 ill. 1902. (In Engineering news, v.47, p.410.)

Pratt, R. Winthrop.

Combined septic tanks, contact beds, intermittent filters and garbage crematory, Marion, O. 5,000 w. 15 dr. 3 ill. 1906. (In Engineering news, v.55, p.197.)

Proposed new sewage settling tanks, contact and storm beds for Sheffield, England. 900 w. 1905. (In Engineering news, v.54, p.597.)

Recent Crossness [London] experiments with bacterial sewage treatment. 3,000 w. 1899. (In Engineering record, v.40, p.507.)

Results of intermittent filtration experiments using coke and allowing sewage to stand in filters for three hours before passing through. Purification to a considerable degree has been obtained.

Report of a London engineer on sewage disposal at Toronto, Ont. 2,000 w. 1906. (In Engineering news, v.56, p.262.)

Discusses disposal by septic tank and contact beds and by discharge into the lake.

Report on sewage sludge deposits on the experimental coke beds, London, England. 1,100 w. 1900. (In Engineering news, v.43, p.157.)

Information from report by Frank Clowes, especially on effect of sediment on filters and the bacteria found on the coke.

Sackett, R. L.

Sewage purification at the Southern hospital, Evansville, Ind. 2,000 w. 1 dr. 3 ill. 1908. (In Purdue engineering review, v.4, p.80.)

Original plant consisted of chemical precipitation tank and sand filters. New plant uses septic tank, contact bed and aërobic sand filters.

Septic tanks and double contact beds at Burnley, England. 1,700 w. 1905. (In Engineering news, v.54, p.425.)

Septic tanks for the Royal Muskoka hotel. 1,200 w. 2 ill. 1907. (In Canadian engineer, v.14, p.349.)

Works consist of two septic tanks and four contact beds.

Sewage contact filters with automatic control at Auburn [N. Y.]. 2,000 w. 5 dr. 3 ill. 1909. (In Engineering record, v.60, p.212.)

Sewage disposal at Oswestry, England. 1,600 w. 1901. (In Engineering record, v.44, p.10.)

Purification by primary and secondary contact beds.

Sewage disposal at Sheffield, England. 2,100 w. 1900. (In Engineering record, v.41, p.543.)

Describes experiments and observations to determine best method of disposal. Plan adopted was for biological filter beds.

Sewage disposal plant at Lancaster, New York. 1,000 w. 5 dr. 1910. (In Engineering record, v.61, p.609.)

Plant for a village of 4,000 people, comprising grit chambers, septic tanks and contact beds.

Sewage disposal plant at Roebling [N. J.]. 4,000 w. 7 dr. 1 ill. 1910. (In Engineering record, v.61, p.484.)

Plant consists of screening chamber, sedimentation tanks, dosing chamber, primary and secondary contact beds, settling tank, sand filters and sludge beds.

Sewage disposal plant of the Soldiers' Home, Johnson City, Tenn. 2,000 w. 4 dr. 1907. (In Engineering record, v.55, p.521.)

Plant comprises septic tank, four contact beds and four sand filters.

Sewage disposal under difficulties at Leicester, England. 2,600 w. 1 dr. 1 ill. 1910. (In Engineering news, v.64, p.309.)

Describes complicated system of disposal, including treatment in sedimentation tanks, contact beds, and sewage irrigation.

Sewage disposal works at Kirksville, Mo. 1,800 w. 3 dr. 1907. (In Engineering record, v.55, p.393.)

Consist mainly of septic tanks, followed by contact beds and intermittent filter. The effluent from two of the septic tanks is simply sterilized by copper sulphate before being discharged.

Sewage disposal works at Nuneaton, England. 1,400 w. 1902. (In Engineering record, v.46, p.319.)

Describes plant consisting of settling tanks, coarse and fine bacteria beds and an irrigation area.

Sewage disposal works, Grand Canyon, Arizona. 1,200 w. 10 dr. 1910. (In Engineering record, v.61, p.141.)

Sewage is purified by passing through septic tanks, contact beds and auxiliary filters. Effluents used as boiler waters.

Shone sewerage system and bacterial beds at Hampton, England. 1,600 w. 1901. (In Engineering record, v.43, p.405.)

Sewage pumped by compressed air and treated on bacteria beds.

Sutton sewage disposal works. 2,800 w. 6 dr. 1899. (In Engineer, London, v.88, p.378.)

Gives results of use of bacteria beds for treating crude sewage, with subsequent treatment on filter beds. Method proved economical and efficient.

Watson, Hugh Sextus.

Bacterial sewage disposal works at Ash, Dover [England]. 5,000 w. 5 dr. 1903. (In Minutes of proceedings of the Institution of Civil Engineers, v.156, p.392.)

The same, condensed. 2,200 w. (In Engineering record, v.50, p.379.)

Interesting account of plant consisting of scum tank and contact beds. Results not considered as typical for this installation on account of preponderance of brewery refuse in the sewage.

Wilkinson, J. P.

Description of the new works for the biological treatment of the sewage of Manchester [England]. 3,000 w. 3 folding pl. 3 ill. 1902. (In Journal of the Sanitary Institute, v.23, p.593.)

The same, slightly condensed. (In Engineering, v.74, p.553.)

Discussion, p. 609.

Wise, Colin R.

New septic sewage disposal plant. 2,000 w. 1 dr. 3 ill. 1901. (In Municipal engineering, v.21, p.1.)

Describes plant at Liberty, N. Y., consisting of septic tanks and contact beds.

Worley, J. S.

Septic tank and contact beds for treating the sewage of Cherryvale, Kan. 1,500 w. 3 ill. 1910. (In Engineering news, v.63, p.747.)

Wyllie, H. D.

Septic tank and double contact filter beds for treating the sewage of Glencoe, Ill. 800 w. 8 dr. 1901. (In Engineering news, v.46, p.313.)

Through Intermittent Filters

General

Angell, Arthur.

Treatment and disposal of sewage and of sewage sludge. 3,000 w. 1892. (In Transactions of the Sanitary Institute, v.13, p.209.)

Considers Massachusetts experiments and their application to practical disposal methods. Author suggests utilization of sewage sludge and waste gas-lime for production of hydraulic cement.

Barbour, F. A.

Sewage disposal. 2,500 w. 1901. (In Proceedings of the Indiana Engineering Society, v.21, p.93.)

The same. (In Engineering record, v.43, p.301.)

Discusses efficiency of septic tanks and filtration through sand or coarser materials, and the degree of purification desirable.

Barrow, E. G.

Purification of sewage. 2,300 w. 1898. (In Canadian engineer, v.6, p.121.)

Paper before the Canadian Association of Stationary Engineers.

Brief review of possible methods of disposal, describing precipitation tanks and filters.

Bowes, Arthur.

Treatment of sewage by polarite. 2,000 w. 1894. (In Minutes of proceedings of the Institution of Civil Engineers, v.117, p.305.)

The same. (In Engineering news, v.32, p.205.)

The same. (In Engineering record, v.30, p.238.)

"Ferozone" is used as precipitant and the sewage then passes through filters, the active ingredient of which is polarite, mainly a magnetic oxid of iron.

Cannon, H. Lemmoin-.

Sewage and its disposal. 3,000 w. 4 dr. 1 ill. 1905. (In Technics, v.4, p.65.)

The same. (In Scientific American supplement, v.60, p.24857.)

General review of methods in use, with special attention to chemical treatment, with intermittent filtration of the effluent.

Carbonised refuse system of sewage treatment. 900 w. 4 dr. 1890. (In Industries, v.8, p.523.)

The same. (In Scientific American supplement, v.29, p.12081.)

Process used at Leeds, England, in which dry refuse is reduced to charcoal by slow combustion and product used as filtering material for the sewage.

Craig, O. B.

Sewage disposal for a school building; how to build and proportion a combined septic tank and filter bed; explanation of the purification process. 2,500 w. 4 dr. 1910. (In Metal worker, v.74, p.103.)

Denny and Dunipace sewage works. 700 w. 3 dr. 1 ill. 1897. (In Engineer, London, v.83, p.261.)

Intermittent downward filtration plant for a small population.

Denton, J. Bailey.

Intermittent downward filtration. 3,500 w. 1876. (In Journal of the Society of Arts, v.24, p.618.)

Discusses land costs, and relative advantages of intermittent filtration and broad irrigation.

Denton, J. Bailey.

Sewage as a fertiliser of land, and land as a purifier of sewage. 9,500 w. 1871. (In Journal of the Society of Arts, v.20, p.61.)

The same. (In Van Nostrand's eclectic engineering magazine, v.6, p.184.)

Gives results from use of sewage for broad irrigation and from intermittent filtration.

Early example of combined septic treatment and filtration of sewage. 1,200 w. 1901. (In Engineering record, v.43, p.293.)

Describes small scale installations in Italy previous to 1890.

Effect of frost on the sewage filtration beds at South Framingham, Mass. 800 w. 1893. (In Engineering news, v.29, p.174.)

Experiments show that purification can go on, even in extremely cold weather, if large amounts of sewage can be applied to filter beds in a short time.

Experience with clogged sewage beds at Pawtucket, R. I. 2,000 w. 2 ill. 1907. (In Engineering record, v.55, p.413.)

Treatment of beds with copper sulphate caused great improvement.

Filtering experiments by the Massachusetts board of health. 2,500 w. 1889. (In Engineering record, v.20, p.366.)

Information from report for 1888 on efficiency of sand filters, effect of cold weather on intermittent filtration, etc.

Filtration of sewage. 1,200 w. 1891. (In Engineering record, v.24, p.106.)

Abstract of report of the Massachusetts state board of health, giving information on intermittent sand filtration and showing the processes of nitrification that take place.

See also editorial, p.101. 1,000 w.

Galton, Douglas.

Lessons to be learnt from the experimental investigations by the State board of health of Massachusetts upon the purification of sewage. 6,500 w. 1 diag. 6 dr. 1 ill. 1896. (In Journal of the Sanitary Institute, v.17, p.1.)

Discussion, 2,500 w.

Particularly emphasizes necessity for sufficient aëration.

Goodnough, X. Henry.

Description of sewage disposal systems in Massachusetts. 4,700 w. 16 ill. 1904. (In Journal of the Association of Engineering Societies, v.32, p.213.)

Discussion, p.237.

Briefly describes intermittent filtration systems as used in 12 Massachusetts cities.

Guerdrum, George H.

Septic tank and filter bed used for residences in the Philippine islands. 700 w. 5 dr. 1908. (In Engineering news, v.60, p.400.)

Hansen, Paul.

Design of small intermittent sewage filters. 2,500 w. 1910. (In Engineering record, v.61, p.224.)

From paper before the Ohio Engineering Society.

Gives suggestions as to arrangement of plant, construction and arrangement of filter beds and filter material to be used.

Individual sewage purification plant. 1,500 w. 2 dr. 1910. (In Metal worker, v.73, p.828.)

Describes small plant of septic tank and filter.

Kenwood, Henry, & **Butler,** William.

Some observations on the natural purification of sewage. 6,800 w. 1899. (In Journal of the Sanitary Institute, v.19, p.671.)

Discussion, p.717.

Records experiments for purification by anaërobic upward filtration, followed by intermittent downward filtration under aërobic conditions, also experiments on conditions of production and absorption of gases by sewage.

Law, Henry.

Purification of sewage by filtration. 2,200 w. 1896. (In Journal of the Sanitary Institute, v.17, p.479.)

Discussion, p.495.

Explains bacterial principles of purification by filtration and suggests points upon which information is (1896) needed.

Lawrence experiments on the purification of sewage in 1890 and 1891. 1,200 w. 1892. (In Engineering news, v.28, p.559.)

Review of experiments made by the Massachusetts state board of health on filtration of sewage through sand or gravel.

Locke, William W.

Disposal of sewage upon the watersheds of the metropolitan water supply. 3,800 w. 6 dr. 1906. (In Journal of the Association of Engineering Societies, v.36, p.139.)

Briefly describes a number of small sand filtration systems in the Boston metropolitan district.

Lowcock, Sidney Richard.

Experiments on the filtration of sewage. 6,500 w. 2 diag. 2 dr. 1893. (In Minutes of proceedings of the Institution of Civil Engineers, v.115, p.297.)

The same, condensed. 1,400 w. (In Engineering record, v.29, p.141.)

Describes experiments on sewage filtration, with special aëration of tanks. Considerable attention to construction of filter.

Lowcock, Sidney Richard.

Lowcock's system of sewage filtration. 1,200 w. 1894. (In Journal of the Sanitary Institute, v.15, p.685.)

Consists of continuous oxidizing and nitrifying process, in which air is forced by pressure into body of filter.

McClintock, John N.

Biological system of sewage disposal. 2,000 w. 1902. (In Municipal engineering, v.23, p.357.)

Explains construction of purification system by means of septic tank and filter beds.

McClintock, John N.

Sewage disposal. 1,200 w. 1904. (In Municipal engineering, v.27, p.335.)

Describes septic tank and filter bed of gravel and broken stone for disposal of sewage from a summer cottage.

McClintock, John N.

Sewage disposal and water purification. 4,500 w. 1900. (In Municipal engineering, v.19, p.199.)

Paper before the American Society of Municipal Improvements.

Describes system of disposal by the septic tank and subsequent single or double filtration. Considers this the most efficient method.

Massachusetts—State board of health.

Examination of sewer outlets and the effect of sewage disposal, 1903. 152 p. 1903. (In its Annual report (35th), 1903, p.303.)

Describes disposal works of 14 towns and cities of Massachusetts, and shows degree of purification of sewage as concerning pollution of streams.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station. 175 p. 1891. (In its Annual report (23d), 1891, p.423.)

Detailed account of very careful experiments on effect of mechanical composition of materials used in intermittent filtration, effect of cold, treatment of acid sewages, permanency of filters, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1892. 57 p. 1892. (In its Annual report (24th), 1892, p.391.)

Results of continued experiments on clogging of intermittent sand filters, effect of organic dyestuffs in sewage, effect of cold weather on filtration, etc.

Massachusetts—State board of health.

Experiments upon the purification of sewage...at the Lawrence Experiment Station during the year 1893. 54 p. 1893. (In its Annual report (25th), 1893, p.399.)

Results confirm earlier conclusions and give additional knowledge concerning prevention of clogging of intermittent sand filters, removal of sludge, and general management and operation of the filters.

Massachusetts—State board of health.

Filtration of sewage and of water, and chemical precipitation of sewage at the experiment station of the State board of health of Massachusetts in 1888 and 1889. 909 p. Ill. 1890. (In its Report on water supply and sewerage, pt.2.)

Careful record of two years' experiments that have become classic.

Massachusetts—State board of health.

Purification of the sewage of cities and towns in Massachusetts. 85 p. 1898. (In its Annual report (30th), 1898, p.587.)

Detailed description of works and chemical analyses from ten towns.

Massachusetts—State board of health.

Purification of the sewage of cities and towns in Massachusetts. 20 p. 1899. (In its Annual report (31st), 1899, p.555.)

Analyses from ten cities and towns.

Massachusetts—State board of health.

Sewage disposal of cities and towns in Massachusetts by intermittent filtration. 20 p. 1896. (In its Annual report (28th), 1896, p.579.)

Gives analyses of sewage and effluents from works in five cities.

Massachusetts—State board of health.

Sewage disposal of cities and towns in Massachusetts by intermittent filtration. 30 p. 1897. (In its Annual report (29th), 1897, p.507.)

Analyses of raw and purified sewage in seven Massachusetts towns.

Massachusetts—State board of health.

Sewage purification of cities and towns in Massachusetts. 36 p. 1895. (In its Annual report (27th), 1895, p.599.)

Describes works and gives detailed analyses of raw sewage and effluents at Amherst, Brockton, Framingham, Gardner, Marlborough and Medfield.

Massachusetts—State board of health.

Work at the Lawrence Experiment Station. 33 p. 1890. (In its Annual report (22d), 1890, p.34.)

Record of experiments on most efficient size of material for intermittent sand filters and on rate of application of sewage.

Mills, Hiram F.

Purification of sewage and of water. 8,000 w. 1893. (In Transactions of the American Society of Civil Engineers, v.30, p.350.)

The same, slightly condensed. (In Engineering record, v.28, p.217.)

The same, slightly condensed. (In Scientific American supplement, v.37, p.15268.)

Especially concerned with quality of sand used and bacterial action in intermittent filtration. Based on work at Lawrence Experiment Station.

Neely, J. B.

Sewage disposal for private houses. 800 w. 15 dr. 1908. (In Engineering record, v.57, p.696.)

Describes features of small plants designed by A. Marston, consisting of septic tank and filters.

Oldershaw, F. H.

Iron in sewage filters. 1,700 w. 1910. (In Municipal journal and engineer, v.28, p.899.)

Presence of iron in sewage from trade wastes found to lessen efficiency of filters by formation of ferruginous cement.

Schultz-Schultzenstein.

Nitrifying organisms in sewage filters. 9,000 w. 1904. (In Technology quarterly, v.17, p.186.)

Translation from "Mitteilungen aus dem Königlichen Prüfungsanstalt für Wasserversorgung und Abwässerbeseitigung zu Berlin."

Considers possible methods of introduction of nitrifying organisms and conditions for their growth.

Snow, F. Herbert.

Adaptability of the Massachusetts method of intermittent sand filtration to sewage disposal problems in other states. 11,000 w. 3 ill. 1904. (In Journal of the Association of Engineering Societies, v.32, p.225.)

Discussion.

Reviews Massachusetts investigations and describes methods of disposal in use at Saratoga Springs, N. Y., Lakewood, O., Marion, Ia., and in the Bronx river valley, N. Y.

Stability of effluents of sewage filters of coarse materials. 3,000 w. 1902. (In Engineering record, v.46, p.611.)
Slightly condensed from paper by H. W. Clark in report of Massachusetts state board of health, 1901.

Waring, George E. *jr.*
Purification of sewage by bacterial oxidation in artificially aërated filters. 5,500 w. 2 folding pl. 1896. (In Journal of the Sanitary Institute, v.17, p.75.)
Describes method and apparatus for supplying filters with air under pressure.

Waring, George E. *jr.*
Purification of sewage by forced aëration. 1,000 w. 1895. (In Minutes of proceedings of the Institution of Civil Engineers, v.123, p.496.)
Sewage is passed through filters of stone and sand, air being forced through under pressure.

Waring, George E. *jr.*
Sewage disposal at isolated houses. 6,000 w. 13 dr. 1892. (In American architect, v.35, p.166.)
Describes in detail method of sub-surface irrigation.

Watson, W. M.
Some methods of sewage disposal. 2,500 w. 1899. (In Canadian engineer, v.6, p.318.)
Describes methods used by George E. Waring and by Jerome Deery.

Whipple, G. C.
Vitality of sewage bacteria in soil and antagonism of soil bacteria to the typhoid bacillus. 1,600 w. 1902. (In Engineering record, v.46, p.440.)

Winter treatment of sewage beds. 1,800 w. 1903. (In Engineering record, v.48, p.592.)
Information on care of filter beds in winter, as reported from Clinton, Mass., Ames, Ia., Altoona, Pa., Meriden, Conn., Worcester, Mass. and Woonsocket, R. I.

Individual Plants

Barbour, F. A.
Sewage disposal works at Saratoga, N. Y. 9,500 w. 1 dr. 5 folding pl. 10 ill. 1905. (In Journal of the Association of Engineering Societies, v.34, p.33.)
Discussion.
Plant consists of septic tanks and sand filters.

Barbour, F. A.
Sewage distributing tank and automatic dosing apparatus for Marion, Ia. 2,000 w. 3 dr. 1899. (In Engineering news, v.42, p.27.)
Discusses materials most suitable for filter beds and describes automatic apparatus for applying and distributing the sewage on the beds.

Bassett, Carroll Phillips.
East Orange [N. J.] disposal works; their efficiency as compared with other methods. 3,200 w. 1890. (In Engineering news, v.23, p.160.)
Intermittent filtration system is used after sewage comes from precipitation tanks.

Bassett, Carroll Phillips.

Inland sewage disposal, with special reference to the East Orange, N. J. works. 9,000 w. 4 folding pl. 3 ill. 1 map. 1891. (In Transactions of the American Society of Civil Engineers, v.25, p.125.)

Reviews conditions and methods of sewage disposal and describes system installed at East Orange, showing degree of purity attained in the effluent.

Bolling, George E.

Maintenance of sewage filters in winter. 4,000 w. 1906. (In Journal of the Association of Engineering Societies, v.38, p.29.)

Discussion, 3,500 w.

The same, condensed. 1,200 w. (In Engineering news, v.56, p.628.)

Carefully describes methods for treating sewage and caring for filter beds during the winter at Brockton, Mass.

Bradbury, E. G.

Sewage disposal works, Alliance, Ohio. 2,700 w. 2 dr. 1910. (In Engineering record, v.62, p.437.)

Plant under construction to treat sewage by sedimentation and double filtration through contact beds and direct intermittent filters.

Bristol, Conn. sewage disposal works. 400 w. 1 dr. 1896. (In Engineering record, v.34, p.25.)

Plan includes intermittent filtration beds and broad irrigation.

Brockton, Mass. sewage disposal system. 1,000 w. 5 dr. 1894. (In Engineering record, v.29, p.363.)

Sewage to be pumped three miles to filtration beds.

Brooks, Fred.

Sewage disposal at Medfield, Mass. 4,500 w. 4 dr. 1 folding pl. 1888. (In Journal of the Association of Engineering Societies, v.7, p.236.)

Description of small and successful filtration plant.

Bucke, R. M.

Short history of sewage disposal at the asylum for the insane, London, Ontario. 1,400 w. 1898. (In Public health, v.24, p.27.)

The same. (In Canadian engineer, v.6, p.155.)

Disposal is by intermittent filtration. Considerable success has been attained in growing a great variety of vegetables on the filter beds.

Carpenter, George A.

Results obtained with large experimental septic sewage tanks and rapid filtration at Woonsocket, R. I. 1,200 w. 1900. (In Engineering news, v.44, p.435.)

Condensed from paper before the League of American Municipalities.

Carpenter, George A.

Sewage purification at Pawtucket, R. I. 1,700 w. 1 dr. 2 ill. 1896. (In Engineering news, v.35, p.11.)

Description of equipment and operation of filter beds.

Chemical precipitation and rapid filtration of sewage at Madison, Wis. 4,400 w. 10 dr. 1899. (In Engineering news, v.42, p.411.)

Reviews history of sewage disposal at Madison and the results from a trial plant for purification by precipitation, using lime as precipitant, combined with rapid filtration.

Chorley, England, sewage works. 1,700 w. 1 dr. 1898. (In Canadian engineer, v.6, p.221.)

"Ferozone" is used as chemical precipitant and the sludge is pressed in filter presses. Effluent is filtered intermittently.

Clinton, Mass. sewage disposal system. 1,800 w. 11 dr. 1899. (In Engineering record, v.39, p.136.)

Includes very brief description of filter beds.

Clowes, Frank.

Biological disposal of sewage from isolated buildings. 4,000 w. 1 folding pl. 3 ill. 1904. (In Journal of the Royal Institute of British Architects, v.53, p.193.)

Discussion, 8,000 w.

Describes small plant at Horsham, England, where the sewage is passed slowly through a septic tank and the effluent treated intermittently on coke beds.

Darley, W.

Purification of sewage and foul waters by means of the magnetite filter. 3,000 w. 2 dr. 1894. (In Journal of the Sanitary Institute, v.15, p.678.)

Davenport, Milton W.

Studies of the physiological control of sewage filters, at New Britain, Conn. 2,000 w. 1908. (In Engineering news, v.60, p.117.)

Investigations as to value of tests of sewage purification based on the organic life supported in the effluents.

Deery, John Jerome.

Improved methods for the purification of sewage and water as shown in the operation of the municipal plant at Reading, Pa. 6,800 w. 5 ill. 1899. (In Journal of the Franklin Institute, v.148, p.227, 279.)

Detailed, illustrated description of system, in which the sewage is filtered through upper and lower sand filtration beds, with a space of ten feet between.

Dozen years' experience in sewage purification at Santa Rosa, Cal. 1,000 w. 1902. (In Engineering news, v.48, p.254.)

Present method of disposal is by septic tanks, settling tank and upward filtration.

Essex Fells [N. J.] sewage filter. 700 w. 5 dr. 1897. (In Engineering record, v.36, p.97.)

Purification by distributing the sewage over surface of natural beds of gravel with under-drainage.

Experience with intermittent filtration of sewage at Worcester, Mass. 5,000 w. 1 ill. 1906. (In Engineering record, v.54, p.416.)

Information from report by superintendent of sewers on filtration of effluent from precipitation and septic tanks.

Experiments with stale and partially septic sewage on the Brockton filter beds. 3,300 w. 1899. (In Engineering news, v.41, p.66.)

Sewage allowed to become stale before filtering, as in a septic tank. Quality and quantity of sludge formed; crops raised on filter beds.

Flynn, Benjamin H.

Sewage disposal at Shelby, Ohio. 1,600 w. 1 dr. 2 ill. 1902. (In Engineering news, v.48, p.434.)

Plant consists of two septic tanks, a settling basin and two intermittent filters of cinder and gravel.

Flynn, Benjamin H.

Sewage disposal by intermittent filtration at the Montgomery Co. infirmary, near Dayton, O. 1,000 w. 2 dr. 1 ill. 1901. (In Engineering news, v.46, p.179.)

French, Alexis H.

Sewage filtration plant at the Contagious Hospital, Brookline, Mass. 500 w. 2 dr. 1906. (In Journal of the Association of Engineering Societies, v.36, p.132.)

Coke breeze filters used.

Fuertes, James H.

Cambridge sewerage works. 1,000 w. 2 dr. 1898. (In Engineering record, v.38, p.290.)

Milk of lime is added to the sewage but there is no precipitation before the application of the sewage to the filter beds.

Fuertes, James H.

Sewage disposal at Glasgow. 2,000 w. 1899. (In Engineering record, v.39, p.563.)

Description of plant treating about 12,000,000 gallons daily with sulphate of alumina and lime. Effluent passes through filters of sand and coke.

Glasgow sewage works. 3,800 w. 23 dr. 1895. (In Engineering, London, v.60, p.208, 259.)

The same, condensed. 2,000 w. (In Engineering record, v.32, p.460.)

Results of a year's operation of the precipitation and intermittent filtration plant, giving analyses and costs.

Grantham, Richard F.

Disposal of the sewage of London upon the Maplin sands. 3,000 w. 1890. (In Transactions of the Sanitary Institute, v.11, p.187.)

Suggested method for disposal by filtration.

Horetzky, C. G.

Novel method of sewage disposal, especially designed for the city of Toronto. 2,500 w. 1899. (In Canadian engineer, v.6, p.318, 330.)

Method involves combustion of solid matter separated by coke strainers, and final purification by filtration.

Hospital sewage disposal system. 700 w. 1 dr. 1 ill. 1899. (In Engineering record, v.39, p.327.)

Describes plant of Southern Indiana Hospital for the Insane, Evansville, Ind., using combined precipitation and filtration system.

Intermittent sewage filters at Pittsfield, Mass. 1,300 w. 5 dr. 1902. (In Engineering record, v.45, p.438.)

Iowa State College sewage disposal plant. 2,500 w. 1 diag. 4 dr. 2 ill. 1900. (In Engineering record, v.41, p.146.)

Abstract of paper by Marston before the Iowa Engineering Society.

Describes successful operation of intermittent filtration plant, where a partial septic condition is first obtained by a brief storage of the sewage.

Keene, W. F.

Sewage disposal plant at Central Falls, R. I. 1,000 w. 2 dr. 1897. (In Engineering record, v.35, p.451.)

Intermittent filtration plant.

Latham, Baldwin.

Works of sewerage and sewage disposal. 2,000 w. 1879. (In Journal of the Society of Arts, v.27, p.891.)

The same. (In Van Nostrand's eclectic engineering magazine, v.21, p.372.)

Briefly describes the Croydon works, at which sewage is purified by filtration.

MacPhail, James A.

Disposal of sewage at Marlboro, Mass. 2,500 w. 1 folding pl. 1893. (In Transactions of the Canadian Society of Civil Engineers, v.7, p.48.)

Disposal at a small plant having a separating tank and 20 filter beds.

Marston, A.

Sewerage and sewage disposal at Fairmont, Minn. 1,200 w. 6 dr. 1 ill. 1908. (In Engineering record, v.57, p.131.)

Disposal plant includes concrete septic tank and two intermittent sand filters.

Merrill, John.

Sheffield corporation sewage works. 2,300 w. 1886. (In Transactions of the Sanitary Institute of Great Britain, v.8, p.184.)

Purification by intermittent precipitation with lime, followed by intermittent filtration.

Metcalf, Leonard.

Septic tanks, pump wells and filter beds of the Draper Co., Hopedale, Mass. 2,000 w. 2 dr. 1 ill. 1901. (In Engineering news, v.45, p.298.)

Preliminary treatment of acid waste from pickling plant.

Moriarta, D. C.

Sewage disposal plant at Saratoga Springs. 1,200 w. 1905. (In Proceedings of the Conference of Sanitary Officers of the State of New York, v.5, p.92.)

Brief description of operation of septic tanks and filter beds, giving costs and showing accumulation of scum in tanks.

New sewage disposal works at Gardner, Mass. 2,300 w. 9 dr. 1902. (In Engineering record, v.45, p.338.)

Record of operation with coke strainers and sand or gravel filters, where unusually large amount of sewage to the acre is treated.

Notes on the operation of the sewage filter beds of Plainfield, N. J. 1,000 w. 4 ill. 1899. (In Engineering news, v.41, p.162.)

Notes on the sewerage system of Worcester, Massachusetts. 2,500 w. 3 ill. 1904. (In Engineering record, v.49, p.528.)

Contains information on cost and details of cleaning the filter beds.

Old and new methods of sewage purification at Pawtucket, R. I. 2,500 w. 1902. (In Engineering news, v.47, p.178.)

Gives information from report of city engineer on treatment of Pawtucket sewage in septic tank and on intermittent filters. Comparisons are made of the sludge removed from the tank and of sludge that was formerly raked from the filters.

Olive, William Thomas.

Description of the Manchester main drainage works. 6,000 w. 1894. (In Proceedings of the Institution of Mechanical Engineers, v.47, p.381.)

Sewage treated with lime and the effluent carried to filter beds.

Operation of the Brockton [Mass.] sewage filter beds in 1895. 2,300 w. 1896. (In Engineering news, v.35, p.141.)

Mainly an extract from report of the city engineer. Discusses rate of flow of sewage and its distribution, disposal of sludge, raking of beds, effect of frost on beds, etc.

Operation of the Pawtucket, R. I. sewage filter beds. 700 w. 1897. (In Engineering record, v.35, p.295.)

Operation of the sewage filter beds at Brockton, Mass. in 1899. 1,200 w. 1900. (In Engineering news, v.43, p.213.)

Figures given on the degree of pollution of the river water by the introduction of the effluent and on the cost of operation of the plant.

Operation of the sewage filter beds of Brockton, Mass. in 1896. 2,300 w. 1897. (In Engineering news, v.37, p.307.)

Review of report of city engineer, giving particular attention to crops of vegetables raised on filter beds.

Rapid double filtration and aëration of sewage at Reading, Pa. 5 dr. 3 ill. 1898. (In Engineering news, v.39, p.50.)

Describes construction, operation and results from this disposal plant, finally working satisfactorily.

Recent changes in sewage disposal, Worcester, Mass. 3,500 w. 1 dr. 1900. (In Engineering record, v.41, p.242.)

Includes historical sketch of the plant, which purifies the sewage by chemical precipitation, with description of new filter beds constructed and methods for handling the sludge.

Results obtained with the Ames sewage disposal works. 1,800 w. 1900. (In Engineering record, v.41, p.177.)

Review of two papers by Weems and Pammel before the Iowa Engineering Society. Gives chemical and bacteriological analyses at intervals extending over six months at the plant of Iowa State College.

Sackett, R. L.

Sewage purification plant at the Eastern Indiana Hospital for the Insane. 2,200 w. 2 ill. 1904. (In Proceedings of the Indiana Engineering Society, v.24, p.140.)

Small plant, consisting of septic tank and four sand filters.

Sewage disposal at Acton, England. 750 w. 1891. (In Engineering record, v.24, p.43.)

Describes works in which precipitant consists of salts of iron, aluminium and magnesium. Sewage is then run through filter beds of magnetic, spongy carbon, mixed with sand.

Sewage disposal at Aldershot [England]. 1,000 w. 1899. (In Engineering record, v.40, p.603.)

Description of plant in which the sewage passes through primary and secondary filter beds. Purification has been very successful.

Sewage disposal at Berlin, Ont. 2,400 w. 6 dr. 2 ill. 1905. (In Engineering record, v.52, p.711.)

Plant consists of two septic tanks, storage tanks and 14 acres of intermittent sand filters. Purification is complicated by presence of trade wastes in the sewage.

Sewage disposal at Brockton, Mass. 2,000 w. 1899. (In Engineering record, v.40, p.121.)

Information is given on effect of sedimentation before the filtration of sewage.

Sewage disposal at Chorley, England. 1,000 w. 1 dr. 1898. (In Engineering record, v.38, p.560.)

Method of disposal consists of precipitation by "ferozone" and filtration through filters containing polarite.

Sewage disposal at Elmhurst, N. Y. 2,200 w. 3 dr. 4 ill. 1905. (In Engineering record, v.52, p.87.)

Plant designed to treat 1,000,000 gallons of sewage a day by sedimentation and intermittent sand filtration.

Sewage disposal at Mendota, Ill. 900 w. 16 dr. 1900. (In Engineering record, v.41, p.493.)
Intermittent sand filtration system.

Sewage disposal at Salford [England]. 2,300 w. 1 dr. 1896. (In Engineer, London, v.81, p.68.)
Purification at the time was by chemical precipitation, with filtration following. Considers sand as efficient a material for filters as could be obtained.

Sewage disposal at Saratoga Springs, N. Y. 4,500 w. 4 dr. 3 ill. 1905. (In Engineering record, v.51, p.82.)
Description of plant consisting of septic tanks and intermittent sand filter beds.

Sewage disposal at Wauwatosa, Wis. 1,300 w. 5 dr. 1 ill. 1901. (In Engineering record, v.44, p.565.)
Detailed description of septic tank and filter beds.

Sewage disposal at Woonsocket, R. I. 1,500 w. 5 dr. 2 ill. 1899. (In Engineering record, v.39, p.250.)
Description of arrangements of settling basins and filter beds.

Sewage disposal by intermittent filtration at Leicester, Mass. 1,400 w. 1900. (In Engineering news, v.43, p.231.)

Sewage disposal for the Glenwood Children's Home, Mahoning county, Ohio. 800 w., 4 dr. 1902. (In Engineering news, v.47, p.98.)
New system uses settling basin and intermittent sand filters.

Sewage disposal, Framingham and Marlborough, Mass. 1,800 w. 2 dr. 1894. (In Engineering record, v.29, p.107.)
Small plants for disposal by intermittent filtration. Considerable success in raising crops on Framingham filter beds.

Sewage disposal on land at Litchfield, Conn. 500 w. 1897. (In Engineering news, v.38, p.285.)

Sewage disposal plant at the Ohio Soldiers' and Sailors' Home, Sandusky [Ohio]. 3,000 w. 4 dr. 1909. (In Engineering review, New York, v.19, September, p.33.)
Sewage treated in septic tanks, followed by treatment on intermittent sand filters. Cost data given.

Sewage disposal works, North Attleborough, Mass. 2,500 w. 6 dr. 1910. (In Engineering record, v.62, p.244.)
Description of works consisting of two settling tanks and 16 intermittent sand filters.

Sewage disposal works of Newton, New Jersey. 1,500 w. 3 dr. 1 ill. 1907. (In Engineering record, v.55, p.472.)
Describes septic tanks and sand filters.

Sewage filter beds at Paris, Tex. 1,100 w. 1 dr. 1 ill. 1897. (In Engineering news, v.38, p.98.)

Sewage filter beds at Waterloo, Ont. 900 w. 3 dr. 1896. (In Engineering news, v.35, p.222.)

Sewage filter beds of Altoona, Pa. 1 diag. 1 dr. 1 ill. 1897. (In Engineering news, v.38, p.50.)
Describes conditions and proposed intermittent filtration beds, giving estimated costs.

Sewage filtration at Winsford [England]. 3,300 w. 2 dr. 1898. (In Engineer, London, v.85, p.567.)
Discussion of very satisfactory results with intermittent filters.

Sewage purification at the Eastern Indiana Hospital for the Insane. 1,000 w. 1905. (In Engineering record, v.52, p.497.)
Sewage is treated in septic tank and on gravel filters.

Sewage purification by intermittent filtration at Central Falls, R. I. 1,000 w. 1 dr. 1898. (In Engineering news, v.40, p.133.)

Sewage purification by intermittent filtration at Spencer, Mass. 1,500 w. 3 dr. 1898. (In Engineering news, v.39, p.190.)

Shields, W. S.
Septic tank and sand filters at Downer's Grove, Ill. 1,800 w. 3 dr. 1906. (In Engineering news, v.55, p.162.)
Condensed from paper before the Illinois Society of Engineers and Surveyors.

Shields, W. S.
Sewage disposal plant at Downer's Grove, Ill. 1,600 w. 4 dr. 1 ill. 1906. (In Engineering record, v.53, p.127.)
Describes plant treating sewage in septic tanks, with subsequent sand filtration.

Small septic and nitrification sewage treatment plant near Chicago. 2,000 w. 1899. (In Engineering news, v.42, p.155.)
Describes construction and operation of plant for large country club.

Turneaure, F. E.
New sewage disposal plant at Madison, Wis. 3,700 w. 1901. (In Engineering news, v.46, p.286.)
The same. (In Engineering record, v.44, p.372.)
The same. (In Municipal engineering, v.21, p.302.)
Paper before the American Society of Municipal Improvements.
Plant consists of septic tank and coarse filters. Detailed description of arrangement and construction.

Use of copper sulphate at Pawtucket, R. I. to prevent the clogging of sewage filter beds by blanket growth of micro-organisms. 2,500 w. 2 ill. 1907. (In Engineering news, v.57, p.379.)
From a bulletin of the Rhode Island state board of health.

Van Valkenburgh, J. J.
Sewage disposal plant at the state colony for the insane, Gardner, Mass. 1,200 w. 6 dr. 4 ill. 1906. (In Journal of the Association of Engineering Societies, v.36, p.134.)
Intermittent filtration through sand.

Watson, Irvine.
Sewage disposal at Fond du Lac, Wisconsin. 1,700 w. 2 dr. 1 ill. 1902. (In Municipal engineering, v.22, p.288.)
Describes septic tank installation, with filter beds in addition.

Weston, Robert Spurr.
Operation of the small sewage filters at Lake Kushaqua, N. Y. 400 w. 1906. (In Journal of the Association of Engineering Societies, v.36, p.131.)

Wetherbee, George H. *jr.*

Sewerage system of the Hyannis State Normal School. 600 w. 1 dr. 1906. (In Journal of the Association of Engineering Societies, v.36, p.136.)

Briefly describes sand filters.

Through Continuous, Percolating, Sprinkling or Trickling Filters

General

Clark, H. W.

Eight years' work with trickling sewage filters at the Lawrence Experiment Station. 5,000 w. 1 dr. 1 ill. 1907. (In Engineering news, v.57, p.397.)

See also editorial, p.405.

Clifford, William.

On percolation beds. 4,500 w. 1908. (In Minutes of proceedings of the Institution of Civil Engineers, v.172, p.283.)

The same, slightly condensed. 4,000 w. (In Engineering record, v.59, p.150.)

Studies percolation beds or trickling filters with special reference to rate of passage of sewage through different filter materials.

Continuous filtration of sewage. 1,600 w. 1901. (In Engineering, v.72, p.810.)

Editorial description and comment on Stoddart filter, constructed of coarse stones, onto which the sewage is fed continuously in fine drops.

Experience with fine-grain percolating filters for sewage. 2,200 w. 1 diag. 1906. (In Engineering record, v.54, p.444.)

Information from report by George Reid to the Royal Commission on Sewage Disposal, giving experience at Hanley, England.

Experimental treatment of effluents of sprinkling sewage filters. 1,700 w. 1908. (In Engineering record, v.58, p.615.)

Experiments on high degree of purification of effluents, mainly by use of coagulants and mechanical filtration. Information is taken from report of the Massachusetts state board of health.

Fuller, George W.

Notes on sprinkling filters for sewage treatment; a résumé of American and foreign experience. 5,800 w. 1906. (In Engineering record, v.53, p.756.)

Gage, Stephen De M.

Investigations of the distribution of sewage upon trickling filters. 9,000 w. 17 dr. 1908. (In Engineering news, v.60, p.199.)

Report of investigations at the Lawrence Experiment Station upon different types of sprinklers to determine principles underlying them and to determine effect of filter materials upon distribution.

International system of bacterial sewage treatment. 1,800 w. 1900. (In Engineering record, v.41, p.319.)

Devoted especially to method in use at Southwold, England. Sewage is successively introduced onto anaërobic beds and aërobic beds containing polarite, being distributed on the oxidizing beds continuously by means of sprinklers.

Lawrence experiments regarding the distribution of sewage over sprinkling filters. 6,000 w. 1908. (In Engineering record, v.58, p.724.)

Information from report of the Massachusetts state board of health on different types of sprinklers used and other distribution devices.

Maddocks, Arthur Percy.

Notes on the automatic revolving sewage-distributors at the Derby sewage-disposal works. 3,500 w. 6 diag. 1909. (In Minutes of proceedings of the Institution of Civil Engineers, v.178, p.353.)

The same, condensed. 2,000 w. (In Engineering record, v.62, p.128.)

Consists mainly of a series of tests.

Martel, E.-A.

L'épuration des eaux résiduaires et les expériences du Dr Calmette. 2,000 w. 4 ill. 1906. (In La Nature, v.66, p.390.)

Describes work of Calmette at the experiment station at Madeleine, France with septic tanks and bacterial sprinkling filters.

Murray, T. Aird.

Main sewerage and sewage disposal. 13,000 w. 17 dr. 1 ill. 1908. (In Canadian engineer, v.15, p.501, 511, 522, 546.)

Includes review of methods of sewage disposal and description of "an up-to-date bacteriological treatment system" for a small town, consisting of liquefying tanks and continuous filters.

Murray, T. Aird.

Sewage disposal in Saskatchewan. 2,000 w. 1910. (In Canadian engineer, v.19, p.290.)

Paper before the American Public Health Association.

Considers the best methods for this province to be by sedimentation tanks, trickling filters and final disinfection.

Phelps, Earle B.

Method for testing and comparing sewage sprinklers. 3,000 w. 1 diag. 1906. (In Engineering news, v.56, p.410.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.4.)

The same. (In Technology quarterly, v.20, p.34.)

Mathematical analysis of conditions involved in securing the greatest evenness of distribution.

Reid, George.

Nitrification of sewage. 6,000 w. 2 diag. 1907. (In Proceedings of the Royal Society of London, series B, v.79, p.58.)

The same, condensed. 3,000 w. (In Journal of the Royal Sanitary Institute, v.28, p.142.)

Object is "to direct attention to certain observations...bearing upon depth of filters and grade of particles as affecting both the quality of the work done and the capital outlay involved."

Stoddart continuous sewage filter. 2,800 w. 4 dr. 1902. (In Engineering record, v.46, p.174.)

Describes coarse filter, allowing rapid filtration.

Taylor, William Gavin.

Aërating and flushing system for percolating sewage filters. 3,000 w. 9 dr. 1909. (In Engineering news, v.62, p.196.)

Taylor, William Gavin.

Aërial distribution of sewage over percolating filters. 12,500 w. 10 diag. 5 dr. 2 ill. 1909. (In Engineering news, v.62, p.511.)

Tests of types of distributors at the experiment station at Waterbury, Conn., effect of cone angle, orifice elevation, blade length, variation in nozle pressure, etc.

Taylor, William Gavin.

Experiments in distribution of sewage over sprinkling filters at Waterbury, Conn. 2,400 w. 11 dr. 1907. (In Engineering record, v.55, p.10.)

Describes experiments with different types of distributors.

Taylor, William Gavin.

Municipal sewage experiment station of Waterbury, Conn. 4,500 w. 8 dr. 4 ill. 1907. (In Engineering news, v.57, p.238.)

One object of experiments was to test availability of sprinkling filters under local weather conditions in winter.

Taylor, William Gavin.

Sub-surface distribution in percolating sewage filters. 2,000 w. 8 diag. 3 ill. 1909. (In Engineering record, v.59, p.710.)

Consideration of efficient distribution as affected by size of filter material and rate of flow.

Watson, John D.

Sewage disposal by biological processes. 2,000 w. 1907. (In Engineering, v.84, p.34.)

The same. (In Engineering record, v.56, p.91.)

The same, condensed. 1,200 w. (In Engineering news, v.58, p.89.)

Paper before the engineering conference of the Institution of Civil Engineers.

Based on experience with septic tanks and percolation filters at Birmingham, England. Gives many useful suggestions concerning operation.

Watson, John D.

Treatment and disposal of sewage. 5,000 w. 1906. (In Engineering news, v.56, p.452.)

Condensed from paper before the Incorporated Sanitary Association of Scotland.

Discusses construction of percolation beds, size of medium to be used, removal of solids, distribution of sewage, etc.

Willcox, J. E. & **Reid,** George.

Importance of uniform distribution of sewage on filters. 4,500 w. 1904. (In Journal of the Royal Sanitary Institute, v.25, p.494.)

Discussion, 4,000 w.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

Investigations on the purification of Boston sewage in septic tanks and trickling filters (1905–1907). 18,000 w. 9 diag. 2 dr. 1 folding pl. 7 ill. 1907. (In Technology quarterly, v.20, p.387.)

"References," p.450.

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.4.)

Gives results of successful experiments, indicating that trickling filters and chemical disinfection should solve the sewage problem of Boston and that the septic tank need not be used.

Winslow, Charles-Edward Amory, & **Phelps,** E. B.

Trickling filter at the Sewage experiment station of the Massachusetts Institute of Technology. 2,000 w. 2 dr. 3 ill. 1906. (In Engineering news, v.56, p.168.)

In a short period of operations the continuous trickling filters have given results equal to those obtained with double contact system and at much greater rate of flow. Ingenious method of distribution is used.

Winslow, Charles-Edward Amory, *and others.*

Studies of sewage distributors for trickling filters. 14,000 w. 4 diag. 5 dr. 9 ill. 1907. (In Technology quarterly, v.20, p.325.)

The same. (In Massachusetts Institute of Technology. Contributions from the Sanitary research laboratory and sewage experiment station, v.4.)

The same, condensed. 7,000 w. (In Engineering news, v.59, p.28.)

The same, condensed. 8,000 w. (In Engineering record, v.57, p.46, 74.)

Mathematical study.

Individual Plants

Baltimore sewage purification plant. 2,500 w. 6 ill. 1909. (In Municipal journal and engineer, v.27, p.769.)

Illustrated description of the hydrolytic clarifying tanks and of the sprinkling filters.

Baltimore sewage testing station. 1,500 w. 12 dr. 1906. (In Engineering record, v.54, p.550.)

Description of arrangement of experimental plant, consisting of septic tanks, sprinkling filters, etc.

Baltimore's sewerage and sewage disposal. 4,500 w. 7 dr. 3 ill. 1907. (In Municipal journal and engineer, v.23, p.632.)

Considers especially tests of soils to determine their availability as filtering materials. Plant to consist of septic tanks, sprinkling filters and final intermittent sand filters.

Bass, Frederick H.

Sewage purification works of the State agricultural school, St. Anthony park, Minn. 1,000 w. 11 dr. 2 ill. 1908. (In Engineering news, v.59, p.685.)

Plant consists of septic tank, percolating filter and sand filter.

Beard, Elmer H.

History of the construction of the Reading sewerage system and disposal plant. 8,000 w. 2 dr. 2 ill. 1909. (In Journal of the Engineers' Society of Pennsylvania, v.1, p.39.)

History from the point of view of ordinances of city councils.

Chancellor, W. B.

Sewerage and sewage disposal works, Lichfield [England]. 1,500 w. 3 dr. 1910. (In Canadian engineer, v.18, p.526.)

Treatment is by sprinkling filters, with preliminary treatment in sedimentation and septic tanks.

Chase, E. Sherman.

Operation of the Reading [Pa.] sewage purification works. 3,500 w. 2 diag. 1910. (In Engineering record, v.62, p.186.)

Gives results from over two years' satisfactory operation. Special attention given to the working of the sprinkling filters.

See also editorial, p.170.

Combined chemical and biological sewage disposal works at Chichester, England. 2,000 w. 1905. (In Engineering record, v.51, p.54.)

Description of enlarged works at which chemical treatment is supplemented by a continuous filter for the dry-weather flow and contact beds for treating the storm water.

Disposal of manufactural wastes and sewage at Gloversville [N. Y.]. 14,000 w. 4 diag. 3 dr. 1 ill. 1910. (In Engineering record, v.61, p.107, 129, 157.)

Situation is complicated by presence of large amount of waste from tanneries and leather industries, which are passed through settling tanks before entering main sewers. After careful experiments with different methods, recommendations were that sedimentation be adopted as preparatory method of treatment and that the effluents pass through sprinkling filters, secondary sedimentation basins and sand filters.

Engineers' report on a comprehensive sewage purification plant for Baltimore, Md. 2,500 w. 1906. (In Engineering news, v.56, p.177.)

Reviews plans of engineers on methods of disposal, with detailed estimate of cost. Recommendations were for septic tanks, sprinkling filters and settling basins, with supplementary intermittent filtration.

Experimental sewage treatment works for Baltimore, Md. 1,200 w. 30 dr. 1907. (In Engineering news, v.57, p.235.)

Experiments are mainly to determine whether or not intermittent sand filters are necesssary for final purification, after treatment by septic tanks, sprinkling filters and small settling basins.

Gerhard, William Paul.

New sewage purification works for Berlin-Wilmersdorf, Germany. 3,300 w. 5 dr. 3 ill. 1908. (In Engineering news, v.59, p.301.)

"One of the largest and most recent [1908] biological sewage purification plants," consisting of septic tanks, trickling filters and gravel filters.

Gregory, John H.

Improved water and sewage works of Columbus, Ohio. 45,000 w. 4 diag. 94 dr. 18 ill. 1910. (In Proceedings of the American Society of Civil Engineers, Jan. 1910, p.2.)

Includes 45 pages on the sewage works, with description of the septic tanks and sprinkling filters. Many statistical tables, including daily records for period of eight months.

Griggs, Julian.

Sewage purification works at Columbus, Ohio. 3,800 w. 15 dr. 1905. (In Engineering record, v.52, p.730.)

Describes plant to be constructed as result of a year's experiments. Plant will consist of primary and secondary septic tanks, from which the effluent will be distributed by sprinkling filters over filter beds of broken stone.

Hammond, Charles A.

Sewage distribution tests at Mount Vernon, N. Y. 2,500 w. 2 diag. 2 dr. 1 ill. 1910. (In Engineering news, v.63, p.331.)

Tests to determine actual discharge of cylindrical nozles under different heads, and efficiency of distribution by splash-cups of various forms and under varying conditions.

Hazen, Allen.

Disposal of the sewage of Paterson, N. J.; the treatment of a municipal sewage containing large amounts of mill matter. 7,000 w. 4 maps. 1906. (In Engineering record, v.54, p.144, 175.)

Complete abstract of report to the city, recommending either disposal at sea or treatment in settling tanks and sprinkling filters.

Hendrick, Calvin W.

Baltimore sewerage problem. 3,000 w. 1906. (In Bulletin of the League of American Municipalities, v.6, p.134.)

The same. (In Municipal engineering, v.31, p.260.)

Outlines plans for construction of system and works.

Johnson, George A.

Sewage purification for Columbus, Ohio. 3,300 w. 1 ill. 1906. (In Municipal journal and engineer, v.20, p.396.)

Reviews experiments of preparatory processes, sludge disposal methods and filtration processes. Recommendations were for septic tanks and sprinkling filters in two stages.

Kemmler, E. A.

Sewage disposal at Columbus, Ohio. 4,000 w. 5 dr. 13 ill. 1909. (In Municipal journal and engineer, v.26, p.751.)

Detailed description of purification works, consisting of septic tanks, sprinkling filters and settling basins.

Müller.

Die entwässerungsanlagen der gemeinde Wilmersdorf. 10,000 w. 20 dr. 5 ill. 1907. (In Zeitschrift des Vereines Deutscher Ingenieure, v.51, p.1965, 2025.)

Detailed description of extensive works in which sewage is purified by sedimentation basins and sprinkling filter treatment.

New sprinkling filter at Reading [Pa.]. 3,500 w. 5 dr. 6 ill. 1909. (In Engineering record, v.60, p.351.)

Describes addition to purification plant which doubles the filtering area.

Orange, N. J. sewage purification. 1,200 w. 1910. (In Construction record, v.45, p.5.)

Reviews report by consulting engineer, recommending adoption of sprinkling filter system. Includes detailed cost estimates.

Pratt, R. Winthrop.

Sewage purification at Washington, Pa. 10,000 w. 23 dr. 5 ill. 1908. (In Engineering news, v.60, p.53.)

Describes plans for new plant consisting of septic tanks, sprinkling filters and sedimentation basin.

Purification of sewage for power plant purposes. 1,400 w. 1 ill. 1910. (In Engineering record, v.61, p.213.)

Describes purification of sewage from Allis-Chalmers works at West Allis by anaërobic and trickling aërobic filters. Effluents utilized for power purposes.

Report of the Board of advisory engineers of the Sewerage Commission of Baltimore. 12,000 w. 12 dr. 1 map. 1906. (In Engineering record, v.54, p.101, 129.)

Board, consisting of Rudolph Hering, Samuel M. Gray and Frederic P. Stearns, carefully investigated methods in use that would give a high degree of purification. Recommendations were for treatment by septic tanks, sprinkling filters, settling tanks and intermittent sand filters.

Rettger, Leo F.

Fungus growth on experimental percolating sewage filters at Waterbury, Conn. 1,300 w. 1 dr. 1906. (In Engineering news, v.56, p.459.)

Describes appearance and nature of growth and methods for eliminating it.

Robinson, George L.

Sewage purification works at Mt. Vernon, N. Y. 1,700 w. 7 dr. 1909. (In Engineering news, v.61, p.464.)

Describes features of a centrally located plant depending on sedimentation basins and sprinkling filters.

Ryder, Ernest E.

Sewage disposal works at Bushey [England]. 2,500 w. 8 dr. 1910. (In Canadian engineer, v.19, p.225.)

Paper before the Institution of Municipal Engineers.
New works consist of sedimentation or septic tanks, sprinkling filters and sand filters.

Saunders, James.

City of Chichester sewage disposal works. 3,500 w. 1904. (In Minutes of proceedings of the Institution of Civil Engineers, v.158, p.406.)

Plant consists of precipitation tanks, continuous filters and contact beds.

Schladitz, William H.

German sewage disposal plant. 1,500 w. 12 dr. 1906. (In Municipal journal and engineer, v.20, p.392.)

Describes successful plant at Naumburg on the Saale, including septic tanks and percolating filters. Construction cost data given.

Sewage disposal at Birmingham and Salisbury, England. 3,000 w. 1910. (In Engineering record, v.61, p.526.)

Reviews papers by Watson and by Binnie before the Institution of Civil Engineers.

Sewage disposal at Birmingham, England. 2,500 w. 1 dr. 1909. (In Engineering record, v.59, p.160.)

Plant consists of sedimentation and septic tanks and sprinkling filters.

Sewage disposal in Columbus, Ohio. 4,000 w. 1 dr. 1908. (In Municipal engineering, v.35, p.211.)

Discussion of large plant under construction (1908), using septic tanks and sprinkling filters.

Sewage disposal plant at the Montefiore Sanitarium [Bedford Station, N. Y.]. 1,500 w. 4 dr. 1 ill. 1908. (In Engineering record, v.57, p.190.)

Consists of covered septic tank, three sprinkling filters and settling basin.

Sewage disposal plant of Reading, Pa. 3,500 w. 1 dr. 8 ill. 1907. (In Municipal journal and engineer, v.23, p.507.)

Description of what is thought to be "the first large sprinkling filter to be placed in actual service in this country." Plant designed to provide at once for 2,000,000 gallons of sewage a day, with future maximum capacity of 7,000,000 gallons.

Sewage disposal works at Indiana, Pennsylvania. 2,000 w. 7 dr. 1 ill. 1910. (In Engineering record, v.61, p.588.)

Describes plant, under construction, to consist of screening and grit chamber, sludge tanks, dosing tank and coke chamber, sprinkling filters, settling tanks and sludge pond.

Sewage disposal works at Redditch, England. 800 w. 1910. (In Engineering record, v.62, p.496.)

Works consist of screening chambers, liquefying tanks and percolating filters.

Sewage disposal works at the Danville state hospital. 4,000 w. 8 dr. 3 ill. 1910. (In Engineering record, v.61, p.74.)

Consist of primary and secondary sedimentation tanks, sludge bed and sprinkling filter.

Sewage disposal works of Baltimore. 3,000 w. 1 dr. 1909. (In Engineering record, v.59, p.237.)

Description of various arrangements at these works, which consist of hydrolytic tanks and sprinkling filters.

Sewage disposal works of Mount Vernon, N. Y. 5,000 w. 9 dr. 1910. (In Engineering record, v.62, p.219.)

Describes works consisting of screening chamber, settling tanks, sprinkling filters and secondary settling tanks.

Sewage purification plant at Reading, Pennsylvania. 5,000 w. 8 dr. 5 ill. 1907. (In Engineering record, v.56, p.362.)

Describes beginning of an extensive plant to purify sewage by septic tanks and sprinkling filters.

Sewage purification works under construction at Minworth Greaves, England. 3,800 w. 1904. (In Engineering record, v.50, p.417.)

Description of plant for disposal of Birmingham sewage, including intake chambers for automatic regulation of flow of sewage, silt tanks, primary percolating beds, sedimentation tank and secondary percolating beds.

Snow, F. Herbert.

System of sewerage and sewage disposal of Reading [Pa.]. 7,000 w. 6 ill. 1909. (In Journal of the Engineers' Society of Pennsylvania, v.1, p.19.)

History and operation of large sprinkling filter plant with preliminary treatment in septic tanks.

Thon, George L.

Sewage treatment at Bloomington [Ind.]. 2,000 w. 2 dr. 2 ill. 1909. (In Municipal journal and engineer, v.26, p.776.)

Plant consists of settling tank, combined dosing chambers and contact beds, percolating filters and sedimentation basin.

Vrooman, Morrell.

Notes on the proposed sewage disposal plant for Gloversville, N. Y. 1,000 w. 1910. (In Engineering news, v.63, p.482.)

Brief description of plant for sewage containing large amounts of tannery wastes.

Weand, O. M.

Reading sewage disposal plant; the contractor's story of it. 1,800 w. 2 ill. 1909. (In Journal of the Engineers' Society of Pennsylvania, v.1, p.34.)

Sedimentation Only

Degree of purification of sewage by screens and grit tanks, and methods and costs of purifying sewage to higher degree than by fine screens. 5,000 w. 1910. (In Engineering-contracting, v.33, p.579.)

Emscher sewage tanks; sedimentation tanks which keep septic matter and flowing sewage separated. 2,000 w. 6 dr. 1909. (In Municipal journal and engineer, v.27, p.13.)

Hydrolytic sewage tanks. 2,500 w. 6 dr. 1 ill. 1908. (In Municipal journal and engineer, v.25, p.10.)

Describes principles of action, construction of tanks, separating of suspended solids and colloids, etc.

Imhoff, Karl.

Operating control of sedimentation plants, from the German viewpoint. 3,500 w. 2 dr. 1910. (In Engineering record, v.62, p.270.)

Kuichling, Emil.

Clarifying sewage; quantity of organic matter removed by screens and grit tanks. 3,500 w. 1910. (In Municipal journal and engineer, v.28, p.796.)

From report to the city of Rochester, N. Y.

Kuichling, Emil.

Rapid sewage sedimentation; abstract of experimental investigations on the sedimentation of sewage at Cologne, Germany, made by City Engineer Steuernagel. 2,500 w. 1910. (In Municipal journal and engineer, v.29, p.84.)

Kuichling, Emil.

Removal of organic matter from sewage by screens and tanks. 2,500 w. 1910. (In Engineering record, v.61, p.669.)

Discussion of percentage of impurities removed by merely mechanical methods from results of tests in England, Germany and America.

Kurgass, P.

Der Emscherbrunnen; ein neues verfahren der abwasserreinigung. 3,300 w. 4 dr. 1908. (In Zeitschrift des Vereines Deutscher Ingenieure, v.52, pt.2, p.1713.)

Describes new process for sewage purification, a combination of the purely sedimentation method and the septic process.

Ogden, H. N.

First-hand impressions of German sewage disposal. 3,000 w. 1910. (In Engineering news, v.64, p.386.)

Indicates that only preliminary methods of purification by sedimentation or precipitation are generally in use in Germany, complete purification not being demanded.

Potts, Clyde.

Ocean Grove sewage disposal plant. 1,000 w. 3 dr. 1 ill. 1910. (In Engineering record, v.61, p.54.)

Solid matters are removed by means of sedimentation tank.

Puech, A.

La pierre d'achoppement de l'épuration des eaux d'égout et le moyen de la tourner. 5,000 w. 4 dr. 4 ill. 1910. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.113, p.35.)

Considers the disposal of sludge as the stumbling-block in the way of sewage disposal and describes "Puech process," in which solid matters are taken out in preliminary treatment.

Sewage clarification tanks. 1,500 w. 2 ill. 1909. (In Municipal journal and engineer, v.27, p.853.)

Describes two German devices, one a tank operated by siphon action, the other a small sedimentation tank in which the solid matters are almost completely removed automatically.

Sewage disposal; removal of suspended matters. 10,000 w. 13 dr. 1909. (In Canadian engineer, v.16, p.618, 640, 679, 737, 757.)

Deals with design and efficiency of types of sedimentation tanks and with methods of sludge disposal.

Sewage disposal system of Toronto [Canada]. 2,800 w. 6 ill. 1910. (In Municipal journal and engineer, v.29, p.569.)
Disposal by means of deep sedimentation tanks.

Travis hydrolytic sewage tanks at Norwich, England. 3,500 w. 1908. (In Engineering record, v.58, p.100.)
Describes tanks for preliminary treatment in which the liquids are as much as possible removed from prolonged tank action.

Septic Tank Treatment Only

General

Alvord, John W.

Sewage purification plants for summer cottages. 600 w. 1 dr. 1903. (In Scientific American supplement, v.56, p.23233.)
Brief description of simple arrangement of flush tank, anaërobic filter and septic tank.

Ashley, Burton J.

Residential septic tanks. 1,400 w. 1907. (In Engineering news, v.57, p.119.)
From a paper before the American Society of Inspectors of Plumbing and Sanitary Engineers.
Describes author's early experience in installing septic tanks, with special description of the Ashley nitrification duct.

Ashley, Burton J.

Residential septic tanks. 2,200 w. 1902. (In Municipal engineering, v.23, p.355.)

The same. (In Engineering record, v.46, p.346.)
Paper before the American Society of Municipal Improvements.

Automatic vault cleaner. 700 w. 3 dr. 1882. (In Engineering news, v.9, p.117.)
Briefly describes principles on which Mouras's "automatic scavenger" worked and experiments as to its efficiency.
See also reprint. (In Engineering news, v.39, p.306.)

Barbour, Frank A.

Use of the septic tank in connection with sewage disposal works. 18,000 w. Folding pl. 1904. (In Journal of the Association of Engineering Societies, v.32, p.251.)
Discussion of difficulties encountered in use of septic tanks and description of some tank installations. Includes discussion by many of the foremost authorities.

Butler, W. R.

Notes on the septic tank process of sewage purification. 5,000 w. 3 dr. 2 ill. 1907. (In Transactions of the Canadian Society of Civil Engineers, v.20, p.187.)
Discusses the working and efficiency of septic tanks, with notes on history of their development.

Cameron, Donald.

Septic tank system of sewage treatment. 1,900 w. 1897. (In Builder, v.73, p.27.)
Portion of paper before the Devon and Exeter Architectural Society.
Explains underlying principles and advantages of the septic tank.

Cameron Septic Tank Co. *vs.* **Village of Saratoga Springs and the Sewer, water and street commission of Saratoga Springs.**

United States circuit court, northern district of New York, in equity, no.7025, pleadings and proofs. 909 p. [1906.]

Contains much information on methods of septic tank treatment of sewage.

Cameron septic tank patent sustained by the Court of appeals. 6,500 w. 1908. (In Engineering news, v.59, p.88.)

Gives full text of decision declaring the process claims valid.

Damour, E.

Analyses et expériences sur les boues de Colombes et remarques sur leur utilisation. 3,200 w. 1909. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.111, pt.1, p.92.)

Studies the possibilities of utilization of gas from sludge from septic and sedimentation tanks.

Espitallier, G.

L'évacuation des matières de vidange. 4,000 w. 9 dr. 5 ill. 1905. (In Le Génie civil, v.47, p.9, 25.)

Contains description and explanation of septic tanks, with illustrations of installations.

Fosse septique avec utilisation agricole pour habitations rurales. 1,500 w. 2 dr. 1908. (In Le Génie civil, v.53, p.400.)

Liquids from the septic tank are disposed of by broad irrigation.

Fosse septique pour habitations isolées. 2,000 w. 2 dr. 1910. (In Le Génie civil, v.57, p.154.)

Description of septic tank for isolated dwellings.

Kinnicutt, Leonard Parker.

Septic tank; its place in the treatment of sewage. 1,700 w. 1903. (In Engineering record, v.47, p.16.)

Discusses nature of the action in septic tanks and its value.

Marston, A.

Septic tank patents. 3,500 w. 1908. (In Municipal engineering, v.35, p.288.)

Reviews history of patents and patent decisions relating to septic tanks.

Martin, Arthur J.

Sewage purification works for small populations. 5,300 w. 1904. (In Builder, v.87, p.414.)

Paper before the Institute of Sanitary Engineers.

Much useful information regarding design and operation of septic tanks and filters for treating sewage of country houses and small communities.

Metcalf, Leonard.

Antecedents of the septic tank. 5,800 w. 28 dr. 1901. (In Transactions of the American Society of Civil Engineers, v.46, p.456.)

Discussion, 3,500 w.

Consideration of the evolution of the septic tank as shown by early methods of sewage treatment. Subject considered in its bearing on patent rights to the septic tank treatment.

Michel, M.

Épuration des eaux usées. 4,000 w. 1908. (In Annales des ponts et chaussées, mémoires, ser. 8, v.33, p.144.)

Discussion of theory and efficiency of the septic tank, especially of its power to bring solid matters into solution.

Mitchell, John.

New Zealand method of sewage treatment for isolated buildings. 1,800 w. 1907. (In Engineering news, v.58, p.467.)

Describes method using septic tank, with special arrangements for delivery to the tank.

Moigno, F.

Mouras' automatic scavenger. 1,500 w. 1881. (In Minutes of proceedings of the Institution of Civil Engineers, v.68, p.350.)

Abstract translation from "Cosmos," Paris.
Describes an early antecedent of the septic tank.

Moigno, F.

Theory and accurate working of the automatic scavenger. 600 w. 1883. (In Minutes of proceedings of the Institution of Civil Engineers, v.72, p.359.)

Abstract translation from "Cosmos," Paris.
Gives calculations of the inventor for proper size of tank for different amounts of sewage.

Proper size for septic sewage tanks. 1,800 w. 1899. (In Engineering news, v.42, p.107.)

Editorial.

Rafter, George W.

Treatment of septic sewage. Ed.2. 137 p. 1907.

Small book giving outline of bacteriological principles and methods of treatment using septic action.

Review of the history of the septic tank. 2,000 w. 1906. (In Engineering news, v.56, p.111.)

Taken from paper by Alvord before the Illinois Society of Engineers and Surveyors.

Rideal, Samuel.

Bacterial purification of sewage. 25,000 w. 2 diag. 8 dr. 1899. (In Journal of the Society of Arts, v.47, p.683, 695, 707, 719.)

Historical and descriptive review, showing inadequacy of simple precipitation or irrigation methods and emphasizing septic tank processes as the most efficient.

Robinson, Henry.

Biological purification of sewage. 900 w. 1902. (In Journal of the Sanitary Institute, v.23, p.582.)

Discussion, p.609.
Raises question as to whether septic action is more successful with or without spaces between objects, as in a chamber filled with stones.

Septic tank as a method of sewage disposal. 1,700 w. 15 dr. 1909. (In Engineering review, New York, v.19, August, p.34.)

Gives theory and practical operation of septic tanks, with plans of details.

Septic tank experiments of the Massachusetts state board of health. 2,000 w. 1900. (In Engineering record, v.42, p.591.)

Experiments indicate septic tanks to be a valuable aid to sewage purification.

Sewage disposal for country and suburban residences. 1,500 w. 10 dr. 1910. (In Engineering review, New York, v.20, p.43.)

Describes disposal by use of septic tank, with illustrations of tank and accessories.

Smith, W. Ramsay.

Theory and practice of sanitation in country places, including the bacteriolytic tank system. 20 p. 7 dr. 2 ill. 1907.

Pamphlet devoted in part to septic tank practice in South Australia.

Stoddart, F. Wallis.

Tankage of sewage. 4,200 w. 1905. (In Engineering record, v.52, p.574.)

The same. (In Municipal engineering, v.30, p.36.)

Paper before the Royal Institute of Public Health.

Discusses proper tank capacity, formation of secondary deposits, rate of flow through tank and disposal of sludge.

Watson, John D.

Sludge treatment in relation to sewage disposal. 6,000 w. 1906. (In Engineering record, v.54, p.246.)

Paper before the Association of Municipal and County Engineers.

Discusses difficulties and cost of removing sludge, especially as met at Birmingham, England.

See also editorial, p.225.

Williams, R. B. *jr.*

Experiments on septic tank action at Cornell University. 1,200 w. 1 ill. 1901. (In Engineering news, v.45, p.435.)

Describes arrangements, especially adapted for the study of the rest period in septic tanks.

Woodhead, German Sims.

Sewage-sludge disposal by natural agencies. 1,000 w. 1899. (In Minutes of proceedings of the Institution of Civil Engineers, v.138, p.467.)

The same. (In Engineering, v.67, p.795.)

Considers the anaërobic decomposition of sewage sludge in cesspools or similar tanks.

Wyllie, H. D.

Sewage disposal problem and, in conclusion, a description of the septic tank system. 3,000 w. 3 dr. 1907. (In Canadian engineer, v.14, p.328.)

Individual Plants

Alvord & Shields.

New form of septic tank for Holland, Mich. 1,700 w. 7 dr. 1901. (In Engineering record, v.43, p.247.)

Emphasizes necessity of adapting period of standing of sewage to quality and quantity to be treated, and describes tank of variable capacity.

Cameron, Donald.

Some recent experiments in sewage treatment at Exeter [England]. 2,500 w. 1896. (In Engineering, v.62, p.256.)

Abstract of paper before the British Institute of Public Health.

Explains septic tank system as a process following the work of nature.

Cameron, Donald.

Year's experience of the septic tank system of sewage disposal at

Cameron, Donald—*continued.*

Exeter [England]. 4,500 w. 1898. (In Journal of the Sanitary Institute, v.18, p.562.)

Discussion, p.576.

Records successful working of first permanent plant using septic tank and contact filters.

Champaign [Ill.] septic tank. 1,000 w. 1899. (In Engineering record, v.39, p.229.)

Crane, Albert S.

Septic tank system of sewage treatment at Exeter, England. 2,400 w. 1 dr. 1898. (In Engineering news, v.39, p.18.)

Describes operation and extent of septic tanks and of filtration plant.

Decision in the Cameron septic tank suit against Saratoga Springs, N. Y. 12,000 w. 1907. (In Engineering news, v.57, p.347.)

Gives considerable of the history of sewage disposal by means of closed tanks.

Disposal of sewage sludge at Saltley, England. 3,500 w. 1904. (In Engineering record, v.50, p.544.)

Based on paper before the Association of Municipal and County Engineers regarding the treatment of Birmingham sewage. Adoption of septic tank in preference to chemical treatment has halved the expense of sludge disposal.

Ewing, William B

Septic tank at La Grange, Ill. 1,300 w. 3 ill. 1903. (In Engineering record, v.47, p.200.)

Exeter [England] septic tank system. 3,500 w. 1899. (In Engineering record, v.39, p.379.)

Explains principles of the system and gives results obtained at this pioneer septic tank installation, following the explanation of the designer.

Experimental septic tanks at Ithaca, N. Y. 2,500 w. 2 dr. 1 ill. 1902. (In Engineering record, v.45, p.31.)

Experiments with septic tanks together with intermittent filters or Scott-Moncrieff filters to determine proper rest period.

Houston, G. C.

Sewage and sewage disposal at Bedford, Ind. 2,000 w. 1904. (In Proceedings of the Indiana Engineering Society, v.24, p.136.)

Septic tank treatment only.

Kinnicutt, Leonard Parker, & **Eddy,** H. P.

Experiments at Worcester, Mass. on treating acid iron sewage in a closed septic tank. 8,800 w. 1902. (In Engineering news, v.47, p.445.)

Slightly condensed from 3d report of Connecticut Sewerage Commission.

See also editorial, p.436.

The same, condensed. 3,800 w. (In Engineering record, v.45, p.444.)

Observations and experiments on amount of gas evolved, solid matter removed and effect of acids on septic action.

Mason, W. P.

Explosion of the Saratoga septic tank. 4,000 w. 1 ill. 1907. (In Journal of the New England Water Works Association, v.21, p.23.)

Discussion.

Author suggests as cause of explosion the spontaneous ignition of the gaseous mixture by phosphine.

Potter, W. G.

Septic tanks at Greensboro, N. C. 1,200 w. 8 dr. 1904. (In Engineering record, v.50, p.687.)

Proposed septic tank and sewage purification studies at Washington University [St. Louis]. 2,300 w. 1900. (In Engineering news, v.44, p.329.)

Portions of report, discussing conditions that exist in septic tanks and describing proposed tank.

Purification of sewage. 2,500 w. 1898. (In Engineering, v.65, p.82.)

Editorial discussion of the value of experiments with the septic tank at Exeter, England and with other systems.

Recent septic tanks. 1,000 w. 6 dr. 3 ill. 1907. (In Municipal journal and engineer, v.22, p.445.)

Describes plants at Newton, N. J. and Belleville, Ill.

Regulations for sewage and roof water disposal on unsewered premises, Havana, Cuba. 1,000 w. 1907. (In Engineering news, v.57, p.289.)

Provisions for construction of small septic tanks.

Saratoga Springs septic tanks. 2,500 w. 1 ill. 1907. (In Municipal journal and engineer, v.22, p.369.)

Discusses cause of explosion in 1906 and outcome of law suits in connection with Cameron septic tank patents.

Schuyler, James D.

Septic tank for the treatment of sewage at the Soldiers' Home near Santa Monica, Cal. 3,000 w. 2 dr. 2 ill. 1904. (In Municipal engineering, v.26, p.1.)

Septic action and Waterbury [Conn.] sewage. 4,500 w. 1909. (In Canadian engineer, v.17, p.31.)

Discussion of composition of tank effluents, accumulation of sludge and extent of septic action.

Septic sewage disposal at Liberty, N. Y. 1,200 w. 13 dr. 1 ill. 1900. (In Engineering record, v.42, p.146.)

Small plant with some interesting features for disposing of sewage of a resort of fluctuating population.

Septic tank and sewage filter beds for the Essex Co. Lunatic Asylum, Verona, N. J. 800 w. 1899. (In Engineering news, v.42, p.155.)

Describes largest septic tank in use in the United States up to 1899.

Septic tank at Bedford, Ind. 1,300 w. 2 dr. 1902. (In Engineering record, v.46, p.465.)

Description of tank to be operated without further means of purification.

Septic tank at Ithaca, New York. 1,500 w. 4 dr. 1908. (In Engineering record, v.57, p.136.)

Septic tank at Marion, Iowa. 1,400 w. 11 dr. 1901. (In Engineering record, v.43, p.323.)

Septic tank at Overbrook, N. J. 1,200 w. 1899. (In Engineering record, v.40, p.669.)

Interesting account of experience with tank, giving successful results.

Septic tank at Portadown, Ireland. 1,200 w. 1898. (In Engineering record, v.38, p.382.)

Septic tank experiments at Pawtucket [R. I.]. 1,800 w. 1901. (In Engineering record, v.43, p.148.)

Taken from report of city engineer, 1900, describing results of operation of septic tanks, joined with intermittent sand filtration. Includes experiments as to accumulation of sludge in septic tanks.

Septic tank of the Belleville, Ill. sewerage system. 1,600 w. 2 dr. 1907. (In Engineering record, v.55, p.471.)

Septic tank process of sewage treatment at Exeter and Yeovil, England. 3,500 w. 4 dr. 1 ill. 1899. (In Engineering news, v.42, p.275.)

Letter showing development of the septic tank from the cesspool and describing satisfactory working results as observed by the writer.

Septic tank system at Fond du Lac [Wis.]. 800 w. 1902. (In Engineering record, v.45, p.176.)

Septic tank system at Glencoe, Ill. 900 w. 10 dr. 1901. (In Engineering record, v.44, p.368.)

Arrangement of septic tank and aërating bacterial filters.

Septic tank system at Independence [Mo.]. 1,000 w. 5 dr. 1900. (In Engineering record, v.41, p.562.)

System consists of a number of septic tanks in connection with filter beds.

Septic tanks at Birmingham [Ala.]. 2,000 w. 3 ill. 1906. (In Municipal journal, v.21, p.546.)

Describes installation of eight septic tanks, serving a population of from 60,000 to 70,000.

Septic tanks at Vancouver, B. C. 800 w. 4 dr. 1902. (In Municipal engineering, v.22, p.208.)

Describes construction of three tanks, giving satisfactory results.

Sewage disposal plant at Seneca Falls, New York. 2,000 w. 8 dr. 1909. (In Engineering record, v.60, p.287.)

Consists of septic tank with three compartments and a sludge bed.

Sewage disposal works and experiments at Andover, Mass. 3,500 w. 9 dr. 1904. (In Engineering record, v.49, p.526.)

Experiments with septic tanks and intermittent or contact filters, showing that in case of the "old and somewhat stale sewage reaching the Andover disposal works, septic-tank action was not favorable to subsequent purification."

Sewerage at Ithaca. 1,500 w. 4 dr. 2 ill. 1908. (In Municipal journal and engineer, v.24, p.141.)

Sewage to be treated in septic tanks only before discharging into the lake.

Talbot, Arthur N.

Septic tank of the Champaign sewerage system. 4,500 w. 3 dr. 1 ill. 1899. (In Engineering news, v.42, p.111.)

Explains principles of working and local conditions. Satisfactory results have been obtained.

Taylor, William Gavin.

Waterbury [Conn.] sewage and its septic action. 5,000 w. 5 diag. 1909. (In Engineering news, v.61, p.596.)

Considers degree of septic action, especially as affected by season of the year and by the temperature.

Treatment of sewage in a large open septic tank at Worcester, Mass. 900 w. 1902. (In Engineering news, v.47, p.435.)

Information from report of superintendent of sewers, including detailed analyses of sewage before and after treatment.

Vincey, Paul, & **Rolandez,** Ch.

Traitement préliminaire des eaux d'égout; travail des fosses septiques dans l'expérience de Columbus, Ohio. 5,000 w. 1907. (In Bulletin de la Société d'encouragement pour l'industrie nationale, v.109, pt.2, p.886.)

Study of report on treatment of sewage in septic tanks at Columbus, Ohio.

Publications of the Library Now in Print

In the following list wherever two prices are given the first is that for which the publication is sold at the Library only. *All prices are strictly net except for individual publications ordered in lots of twenty or of one hundred. Remittances should be made payable to the order of the Carnegie Library of Pittsburgh.*

Classified Catalogue of the Carnegie Library of Pittsburgh.

FIRST SERIES, 1895–1902. 1907. 3 vol. 3,890 pp. $12.00.

SECOND SERIES, 1902-1906. 1908. 2 vol. 2,020 pp. $5.00.

Bound in English buckram with gilt tops. Include full author and subject indexes. The two series are arranged on the same general plan and comprise in five volumes a complete catalogue of all the books in the Library from 1895 to 1906 inclusive.

The same [in pamphlet form].

The parts of this edition were issued at low prices primarily for use in the city which supports the Library. Little demand was expected from any other source. Each part contains an author index; all except parts 1–3 of the first series have individual title-pages, and each except part 1 of the first series has both a synopsis of classification and a prefatory explanation.

FIRST SERIES, 1895–1902. 10 parts. 1903–07.

Part 1. General Works. 1907. 67 pp. 10 cents, postpaid.

Part 2. Philosophy and Religion. 1903. 223 pp. 10 cents; postpaid, 15 cents.

Part 3. Sociology and Philology. 1904. 340 pp. 15 cents; postpaid, 25 cents.

Part 4. Natural Science and Useful Arts. 1904. 598 pp. 35 cents; postpaid, 50 cents.

Part 5. Fine Arts. 1905. 351 pp. 15 cents; postpaid, 25 cents.

Part 6. Literature. 1905. 308 pp. 15 cents; postpaid, 25 cents.

Part 7. Fiction. 1906. 446 pp. 25 cents; postpaid, 40 cents.

Part 8. History and Travel. 1907. 691 pp. 50 cents; postpaid, 65 cents.

Part 9. Biography. 1907. 381 pp. 20 cents; postpaid, 30 cents.

Part 10. Indexes, Title-pages, Contents, Preface and Synopsis of Classification. 1907. 842 pp. $1.00; postpaid, $1.20.

SECOND SERIES, 1902–1906. parts 2–5. 1907–08.

Part 2. Natural Science, Useful Arts and Fine Arts. 1907. 477 pp. 45 cents; postpaid, 60 cents.

Part 3. Literature, English Fiction and Fiction in Foreign Languages. 1908. 342 pp. 40 cents; postpaid, 50 cents.

Part 4. History and Travel, Collected Biography and Individual Biography. 1908. 465 pp. 45 cents; postpaid, 60 cents.

Part 5. Indexes, Title-pages, Contents, Preface and Synopsis of Classification. 1908. 460 pp. 80 cents; postpaid, 95 cents.

Monthly Bulletin. (Not published in August and September.) 25 cents a year, postpaid. Free at the Library.

Annual Reports, 1st–14th. 1897–1910. Free.
Except the 3d and 6th, which are out of print.

Circular of Information Concerning the Training School for Childrens Librarians, 5th–10th Year. 1905–1910. Free.
No circular was issued for the 8th year, 1908–1909.

Periodicals and Other Serials Currently Received by the Carnegie Library of Pittsburgh. Fifth edition. 1908. 33 pp. 5 cents, postpaid.

Books in the Library of the American Philatelic Society. 1910. 20 pp. 5 cents, postpaid.

Lives and Letters; a Selected and Annotated List. 1910. 36 pp. 10 cents, postpaid.
Reprinted from the *Monthly Bulletin,* March 1910.

Gift of the German Emperor [List of Books, Maps and Photographs]. 1908. 17 pp.
Reprinted from the *Monthly Bulletin,* April 1908.

Letters of General Forbes; Reprint of 35 Letters Relating to the Expedition against Fort Duquesne. 63 pp. 20 cents, postpaid.
In the *Monthly Bulletin*, February, March, April, May, 1909. Not issued in separate form.

Index to Subject Catalogue of the Technology Department. 1909. 50 pp. 10 cents, postpaid.

Index to Proceedings of the Engineers' Society of Western Pennsylvania, Volumes 1 to 20, 1880–1904. Compiled by Harrison W. Craver. 1906. 144 pp. $1.00, postpaid.

Catalogue of Books in the Childrens Department of the Carnegie Library of Pittsburgh. 1909. 604 pp. 75 cents; postpaid, $1.00.

Catalogue of Books, Annotated and Arranged, and Provided by the Carnegie Library of Pittsburgh for the Use of the First Eight Grades in the Pittsburgh Schools. 1907. 331 pp. 35 cents; postpaid, 50 cents.
An enlargement and thorough revision of the lists prepared for the first eight school grades, originally published in the "Graded and Annotated Catalogue of Books...for the Use of the City Schools," now out of print. The other lists contained in that catalogue are undergoing revision.

Annotated Catalogue of Books Used in the Home Libraries and Reading Clubs. 1905. 110 pp. 20 cents; postpaid, 25 cents.

Gifts for Children's Book Shelves; a List for Mothers. 1908. 32 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, November 1908.

Reference Lists

These lists have been compiled to render easily accessible the material in this Library on the various subjects.

*Publications marked * either have not been issued separately or are out of print as separates. Copies of the Monthly Bulletin in which they appeared will be sent postpaid for 5 cents each.*

***Expeditions of Colonel Bouquet to the Ohio Country, 1763 and 1764.** 11 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, December 1909.

Expedition of General Forbes against Fort Duquesne. 1908. 20 pp 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, June 1908.

***Washington's Visits to Pittsburgh and the Ohio Country.** 15 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, February 1908.

***Braddock's Expedition.** 11 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, November 1906.

***The Whiskey Insurrection.** 9 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, July 1906.

Contemporary Biography. 1903. 171 pp. 20 cents; postpaid, 25 cents.
References on 350 contemporary writers, painters, sculptors, musicians, actors, clergymen, scientists, statesmen, sovereigns, social reformers, etc.

Famous Royal Women; a Reading List for Girls. 1908. 11 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, January 1908.

Short Plays and Monologues; a List for Amateurs. 1908. 6 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, January 1908.

Sewage Disposal and Treatment. 1910. 96 pp. 15 cents, postpaid.
Reprinted from the *Monthly Bulletin*, November 1910.

Industrial Accidents; a Select List of Books. 1910. 12 pp. 5 cents, postpaid.

One Hundred Recent Books on Agriculture. 1910. 19 pp. 5 cents, postpaid.

List of Technical Indexes and Bibliographies Appearing Serially. 1910. 17 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, June 1910.

Electric Heating and Cooking. 1910. 16 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, January 1910.

Metal Corrosion and Protection. Second edition, revised and enlarged. 1909. 64 pp. 10 cents, postpaid.
Reprinted from the *Monthly Bulletin*, July 1909.

Refuse and Garbage Disposal. 1909. 39 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, January 1909.

Mica. 1908. 18 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, October 1908.

Floods and Flood Protection. 1908. 48 pp. 15 cents, postpaid.
Reprinted from the *Monthly Bulletin*, July 1908.

Sodium Nitrate Industry of Chile. 1908. 12 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, March 1908.
Enlarged from the brief list which appeared under the same title in the *Monthly Bulletin*, November 1903.

Electric Driving in Rolling-mills and Foundries. 1907. 15 pp. 5 cents, postpaid.
Reprinted from the *Monthly Bulletin*, November 1907.

***Smoke Prevention.** 18 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, May 1907.

***Steam Turbines.** 21 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, November 1904.

***Water Softening.** 8 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, June 1904.

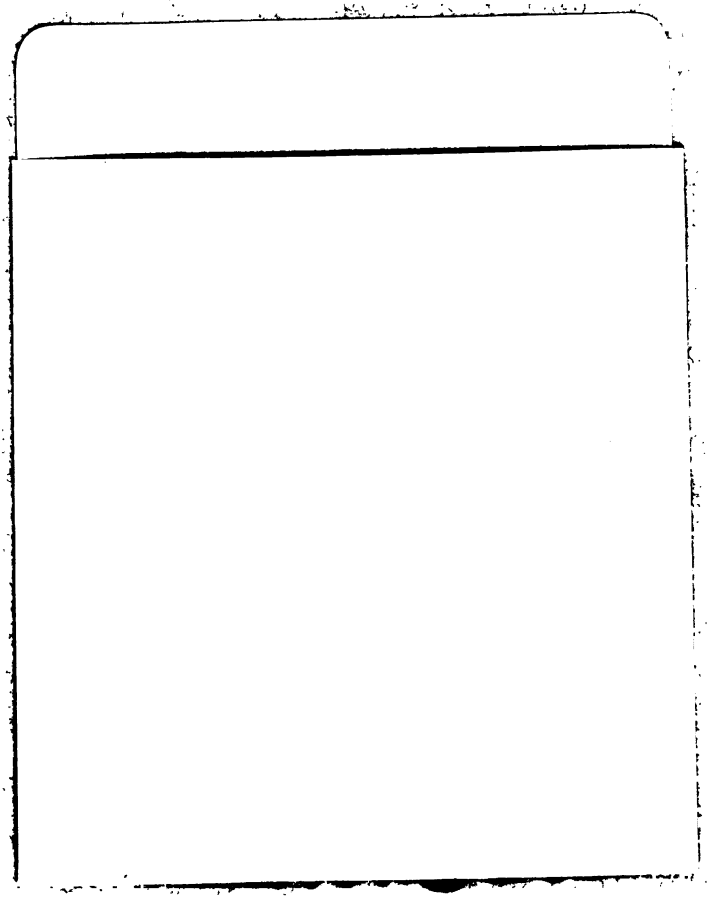
***List of Selections for Reading Aloud to Boys and Girls.** 29 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, January 1907.

Story Hour Courses for Children from Greek Myths, The Iliad and The Odyssey. 1906. 32 pp. 5 cents, postpaid.

***List of Good Games,** with References to Books Telling How to Play Them. 12 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, April 1906.

***List of Good Stories to Tell to Children under Twelve Years of Age.** 1905. 18 pp. 5 cents, postpaid.
In the *Monthly Bulletin*, December 1905.

December 1, 1910.

89088902747

b89088902747a